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DAVID HUME AND THE CULTURE OF SCOTTISH NEWTONIANISM

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METHODOLOGY AND IDEOLOGY IN ENLIGHTENMENT INQUIRY

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The idea that interpreting Hume in the context of then-contemporary natural philosophy might lead to relevant insights originated in a Hume seminar I taught in 2004/2005 at the University of Miskolc. While reading the epistemological and metaphysical arguments of the first *Enquiry* it seemed natural to explore them in the context of eighteenth-century knowledge making practices. I am particularly indebted to my students, particularly Ágnes Fehér–de Vette, Éva Kiss-Koczka, Szilárd Koczka and Ákos Sivadó for their contribution to the initial formulation of the perspectives on Hume adopted for the following chapters.

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Wolfgang Neuber, Claus Zittel (eds.), *Copernicus and His International Reception*, Leiden: Brill, 2015, 88-109.

Introduction

There are various ways in which the world, and man's place in it, can be described, and there is an intriguing history of the concepts and methods in terms of which those descriptions are couched. This history shows that the various ways in which natural and human phenomena are conceptualized are not entirely independent – especially if man is taken to be part of the natural world. It is not only that *some* of the human phenomena, especially those of the human body, are natural phenomena themselves and as such are seen on par with other natural phenomena. It is also that sometimes phenomena treated as *distinctively* human are also seen through concepts that have affinities to those expressed in the idiom by which nature is represented. The languages in which one can talk about phenomena of nature and human nature sometimes reveal a remarkable convergence.

Since at least Hegel philosophers are frequently thought of as Minerva's owls that begin their flight only after dusk: they are not in the forefront of developments but reflect on the consequences only when they already have taken place. In a similar vein it has become a common wisdom in intellectual history that eighteenth-century Scottish moral philosophy evolved under the aegis of Newton. It is also frequently suggested that David Hume, one of the most influential practitioners of this kind of inquiry, aspired to be the Newton of the moral sciences.[1] Usually this goes hand in hand with a more or less explicit reading of Hume's theory of ideas, the foundation of his science of man, as written in an idiom of particulate inert matter and active forces acting on it – i.e. essentially in the language of Newton's *Principia*. Hume's outlook on the mental world is thus frequently described in terms of conceptual atoms whose association is compared to interparticulate attractions modelled on Newtonian forces in general, and gravity in particular.[2]

In a different context it is also frequently acknowledged that natural inquiry in eighteenth-century Scotland in general, chemistry and physiology in particular, was also

immensely influenced by Newton – especially by the *Opticks* compared to which the *Principia* played only a secondary role.[3] As Colin Maclaurin puts it in his account of Newton's discoveries: while the *Principia* inquires into forces acting between bodies in great distance, the *Opticks* explores the "hidden parts of nature", which are not so easily "subjected to *analysis*" because of the subtlety and minuteness of the agents.[4] Cullen's chemistry is aptly interpreted as Newtonian in this sense: as belonging to the research tradition the *Opticks* initiated, and as such it pursued a project of discovering the internal micro-force relations of matter to be placed alongside with the intra-body macro-force of Newtonian gravity.[5]

It is important to see that while Newton's name, due to his *Principia*, is primarily associated with dynamic (as opposed to kinetic) corpuscularism, the inspiration of a qualitatively oriented vitalistic approach might have come partly from the "Queries" of his *Opticks*: the ether hypothesis put forward in these passages provided the main inspiration for the idea of a natural world populated by active principles. Although initially 'ether' was interpreted as a mechanistic concept, and it was ascribed the role of transmitting forces between bodies, its re-interpretation first as a materialistic concept and then as a vitalistic active principle was widespread and increasingly popular among eighteenth-century naturalists – so much so that even Hume himself seems to favour the latter interpretation.[6]

In the following chapters I will argue that Hume's theory can be understood in Newton's wake, albeit not in the context of the *Principia*'s reception as it is most frequently read, but in that of the *Opticks*. I intend to show that Hume, while discussing moral phenomena, relies on conceptual and methodological resources that are convergent with contemporary physiology and philosophical chemistry. Both Hume and eighteenth-century Scottish Newtonians in these fields contribute to a language and method that provide an alternative to that of mechanical philosophies. They share an outlook, arguably inspired by Newton's Queries in the *Opticks*, which is sensitive to qualitative differences and refer to internal active forces in both nature and human nature – a language, which would count as heretical from the perspective of the *Principia*'s dynamic corpuscularism, and even more so from the perspective of any kind of kinetic corpuscularism. Their common qualitative and vitalistic orientation can be

seen as a new connective between moral and natural inquiry, and it also connects Scottish philosophy to the contemporary European trends of an "Enlightenment vitalism".[7]

Thus far from being Minerva's owl, Hume is a creative and imaginative thinker contributing to a new language and methodology for the autonomous study of human nature, i.e. a *moral philosophy* in the eighteenth-century sense of the term. In accordance with eighteenth-century classifications of knowledge,[8] Humean moral philosophy is primarily an explanatory enterprise – just like natural philosophy. But unlike the latter, moral philosophy is reserved for phenomena pertaining to moral beings *qua* moral beings.

This is why Hume takes pain to separate his science of man from physiology and natural philosophy.[9] His insistence on autonomy goes hand in hand with William Cullen's efforts to establish an autonomous chemistry detached from a mechanical outlook. This effort is motivated on Cullen's part by his disappointment with the explanatory resources that a mechanical outlook could offer on properties relevant in chemical investigation. On Hume's part a similar motivation came from the insight that previous moral philosophies could only offer a fanciful morality instead of real epistemic content and explanatory force. In both cases, the main cause of disappointment with the predecessors was that they had failed to adopt the proper outlook, and therefore to understand the proper language and method of their field of study. While politely acknowledging some earlier efforts, they both considered their own work as ground-breaking in its field.[10]

One of the most persistent metaphors that Hume invokes while describing the inspirations of his project is the *anatomy of the mind*.[11] Hume does indeed take this metaphor seriously, and conceives his enterprise as the moral analogue of anatomical and physiological investigations. Let me quote at length one of the most telling passages in this regard from the *Treatise*:

> 'Tis usual with anatomists to join their observations and experiments on human bodies to those on beasts, and from the agreement of these experiments to derive

> an additional argument for any particular hypothesis. 'Tis indeed certain, that where the structure of parts in brutes is the same as in men, and the operation of these parts also the same, the causes of that operation cannot be different, and that whatever we discover to be true of the one species, may be concluded without hesitation to be certain of the other. Thus tho' the mixture of humours and the composition of minute parts may justly be presum'd to be somewhat different in men from what it is in mere animals; and therefore any experiment we make upon the one concerning the effects of medicines will not always apply to the other; yet as the structure of the veins and muscles, the fabric and situation of the heart, of the lungs, the stomach, the liver and other parts, are the same or nearly the same in all animals, the very same hypothesis, which in one species explains muscular motion, the progress of the chyle, the circulation of the blood, must be applicable to everyone; and according as it agrees or disagrees with the experiments we may make in any species of creatures, we may draw a proof of its truth or falsehood on the whole. Let us, therefore, apply this method of enquiry, which is found so just and useful in reasonings concerning the body, to our present anatomy of the mind, and see what discoveries we can make by it.[12]

In what follows I will unpack this metaphor and show how Hume's anatomy of the mind relies both methodologically and conceptually on a similarly metaphorical physiology, i.e. the study of the normal functioning of mental faculties, which is built upon the foundations of chemistry, i.e. the study of the constituents of mental phenomena.

In doing so I will proceed as follows. In the first two chapters I introduce the thesis of the methodological and conceptual *unity of early modern natural and moral philosophy* and illustrate it mostly on material taken from the history of Scottish Newtonianism. These chapters argue that Enlightenment philosophy in Scotland – and early modern philosophy in general – should be seen as an integrated enterprise of moral *and* natural philosophy and conceived as intellectual enterprises that developed hand in hand.

By exploring various theoretical discourses of anger in the period, I intend to show that various branches of philosophy exploited the same conceptual resources while discussing a phenomenon in natural, moral and religious contexts. Relying on the same concepts, various branches of theoretical inquiry were so intertwined that different layers of discourse exerted mutual influence on one another: physiological discourses were filled with hidden moral meaning and religious content, and *vice versa*. Therefore, the discourses of the natural, psychological, social and transcendent aspects of human beings exhibited a remarkable *conceptual unity* in this period.

In the second chapter I argue that the unity of moral and natural philosophy can be further illustrated through methodological ideas, and I illustrate this latter thesis through case studies on the development of Scottish Newtonianism in moral philosophy and physiology. In this chapter I begin with contemporary visions concerning the unity of philosophy, and then turn to the discussion of how methodological ideas figure in those visions.

With the third chapter I turn to Hume's methodological and ideological heritage that serve as a background for understanding his account of human nature. In his *Treatise* Hume proclaims that "moral philosophy is in the same condition as natural, with regard to astronomy before the time of Copernicus",[13] and he considers his project to improve moral philosophy so as to reach its post-Copernican phase. In this chapter I explore Copernicus's relevance for Hume's project, the science of man. I shall suggest that Hume's allegiance to Copernicanism means a commitment to searching for principles of human nature underlying various human phenomena – just like Copernicus explored the general principles of explanation for the motions of the planets. Moral philosophy, Hume implies, enters its post-Copernican phase by taking methodological commitments to *explanatory reductionism and analogical reasoning*.

Although his praise for Copernicus is due mainly to methodological considerations, I will also argue that Hume's project has central features that make it similar to Kant's critical project after Kant's Copernican turn. Hume also understands his own project as foundational: a critical work that we cannot dispense with before immersing ourselves into other cognitive enterprises. Similar to Kant's project, Hume's science of man aims to explore the limits and the conditions of possibility of human

knowledge, the main difference being that Hume follows a naturalistic as opposed to a transcendental method. Thus, while a "Copernican turn" means different things in Hume and Kant, its consequences entail important similarities in their philosophical positions.

In chapter four I turn to the intricate question of Hume's relation to Newton. I will argue a negative thesis, namely that several aspects of Hume's project distances him from the ideal of inquiry represented in the *Principia*, and a positive one, namely that several other aspects make it plausible to read him in the context of the experimental tradition that begun to flourish in the aftermath of the *Opticks*, which exerted a more widespread influence in the eighteenth century than the *Principia*.[14]

While I admit that in some respects, for example in the *Treatise*'s analysis of "cause and effect",[15] Hume is indebted to pre-Newtonian mechanism, yet his investigation into human nature follows a path that cannot be accommodated against this background. It is instead the *Opticks*-inspired medical and chemical research of the first half of the eighteenth century that provides a context, and sometimes possibly a motivation for the Humean language of human nature and the method of its exploration. In this context, research is largely justified by the ideology of *improvement*: the aim of theoretical work is to improve existing practices and invent more efficient ones in order to make things better.[16] Hume's science of man finds its intellectual home in this context, detached from the religious ideology that sets the aim of inquiry as being the knowledge of God's intentions and attributes – an aim which Hume does not subscribe to.

In chapter five I explore in further detail this aspect of the heritage of Newtonian natural theology for Hume. As is frequently emphasized, it was a common conviction of early modern natural philosophers that God had written two books, the Bible and the Book of Nature, and studying the latter was to study God through his creation. Early modern natural philosophy and modern science is partly distinguished by the former's intimate relation to God: natural philosophers frequently talked with having God in mind even when they were not directly talking about him. This is clearly true about many of Hume's contemporaries.

In this chapter I focus on sections VIII, X and XI of Hume's first *Enquiry*, and argue that their arguments are complementary if read in this context. Section X argues against the possibility of founding knowledge claims on revealed religion; Part 2 of Section VIII and Section XI argue against the possibility of acquiring knowledge about transcendent matters on the basis of inquiries into natural and moral matters. By challenging the cognitive authority of religion Hume undermines the dominant *ideology of inquiry* that makes sense of contemporary cognitive practices by at least implicit reference to God. Hume's work is therefore ideological in this context: he works for distancing cognitive practices from religious epistemic ideals, and argues for replacing them with secular methodological standards. This is an important legacy with which he contributes to the emerging secular self-image of modern natural science.

With the next part I turn from the context to a closer scrutiny of Hume's method and project. In chapter six I offer a reconstruction of the phrase "experimental method of reasoning" that Hume uses in the *Treatise's* subtitle to characterise his method. Although its meaning may strike the present-day reader as unusual, such a reconstruction is possible against the background of eighteenth-century Newtonian practices and concepts of natural inquiry. As I argue, Hume's inquiries into human nature are experimental not primarily because of the way the empirical data he uses are produced, but because of the way those data are theoretically *processed*. As the previous chapters have suggested, he seems to follow a method of analysis and synthesis quite similar to the one advertised in Newton's *Opticks,* and which, as I argue, brings to light his alignment to the methods of qualitative, chemical investigations rather than to mechanical approaches to both nature and human nature.

Chapter seven sketches the outlines of Hume's anatomy and physiology of the mind that follows from his method. This chapter challenges the above-mentioned view that associates Hume's philosophy with mechanical philosophies of nature and particularly with the Newton of the *Principia*. This view presents Hume's account of the human mind as a passive receiver of impressions that bring into motion, from the outside, a mental machinery whose functioning is described in terms of mechanical causal principles. Instead, I propose an interpretation which suggests that, for Hume, the human mind is composed of non-modular *faculties* that can be characterized by

their active contribution, which frequently results in qualitative change. This anatomy of the mind is explored from a physiological perspective focused on the study of the normal functioning and interaction ascribed to the mind's various organs. While pursuing this enterprise, Hume's outlook turns out to be a natural ally to contemporary Scottish "philosophical chemistry" and vitalistic physiology.

In the final chapter I take a look at how the epistemic ideals Hume observes in his moral philosophy relates to his theory of moral cognition – i.e. how he sees the different values inherent in the descriptive and explanatory enterprise of moral philosophers and the normative work of moralists. Here I argue that Hume is implicitly committed to different epistemic values in his account of moral cognition and in the methodology of his moral philosophy.

In the process of moral cognition, i.e. while making moral judgment, Hume advocates a version of aperspectival objectivity: our moral judgments should be based on sentiments arising from an unbiased, impartial stance by taking into account the perspectives of those involved in the situation under moral consideration. In moral philosophy subjectivity is granted much more latitude and contributes to the process of theory construction: it has a positive role to play in finding analogies between divergent phenomena while drawing an accurate picture of human nature. As a consequence of this difference moral philosophy and moral cognition are separated in Hume, and philosophical insights can enter moral evaluation only through the moralist's work on tuning our moral sentiments.

Hopefully, the present discussion will contribute to understanding Hume's significance in the context of contemporary natural philosophy, and to introduce into the discussion of his work insights from the historiography of science. This could perhaps result in a more balanced view concerning his place in early modern philosophy than the received image of Hume. As a result, it might seem natural to read Hume's *Treatise* as presenting a "middle range theory" in between medical and physiological accounts of human functioning on the one hand, and theories of normative ethics on the other.

THE UNITY OF SCOTTISH NEWTONIANISM

I. The Conceptual Unity of Scottish Newtonianism

Ever since C.P. Snow's famous essay on the "Two Cultures",[17] it has become a commonplace to refer to the divide separating the sciences and the humanities. This divide did not exist for those working on the questions of natural and moral philosophy in various discourses of the seventeenth and eighteenth century. Instead, the participants saw themselves as contributing to a joint enterprise that could potentially converge upon a unified account of natural and moral phenomena encompassing physical, physiological, ethical and theological approaches. While the unifying character of this enterprise was considered as a matter of course, philosophy was not preoccupied with reconciling the "scientific" and the "manifest" image of man, as Wilfrid Sellars' (1963) happy phrase has it, but aspired to a comprehensive explanatory understanding of human beings from their natural, cognitive and affective constitution to their moral and transcendent ends.

Early modern philosophers formulated various visions of the unity of philosophy. At one end of the early modern epistemological spectrum, Descartes's influential vision of the sciences, in his *Principles of Philosophy* (1644), as branches growing out of metaphysical foundations represents one version of how unity could be conceived. Descartes's original vision of method that underpinned this unity prescribed analysis into intuitively clear and infallibly known metaphysical principles, the world's basic constituents, "simple natures", from which deductive knowledge in physics and other fields of knowledge was attainable.[18] At the other end of the spectrum, David Hume's foundational project in his *Treatise of Human Nature* (1739/40) aspired to empirical knowledge about the limits and prospects of human cognition, a basis upon which a "compleat system of the sciences" could be erected.[19]

Due to these visions of the unity of philosophy, its various branches tended to exploit the same conceptual and methodological resources while discussing phenomena in natural, moral and theological contexts. Relying on the same concepts and methods, various branches of theoretical inquiry were intertwined so that different layers of discourse exerted mutual influence on one another: discourses of natural philosophy were filled with hidden moral meaning and religious content, and *vice versa*. Therefore,

the discourses of the natural, psychological, social and transcendent aspects of nature and human nature exhibited a remarkable unity in the early modern period – just before they started to develop into specialized fields of knowledge.

This insight has significance in the context of present-day historiographies of both science and philosophy that are still inclined to treat their canons separately.[20] In the present chapter I intend to point out that the separation of what we call today 'the history of philosophy' and 'the history of science' inculcates a distorted image of early modern philosophy. In this and the following chapter I will make a case for adopting a synoptic view on the history of early modern philosophy and of science as integrated enterprises. I will motivate this commitment by a quick look at how this unity was conceived among Scottish Newtonians in the eighteenth century, and then I make a suggestion as to how to approach moral philosophy from the angle of early modern methodological ideas. It is, as I suggest in the following chapter, the method of analysis-synthesis and its various interpretations that could define a unifying perspective on early modern natural and moral philosophy.

The Unity of Philosophy: The Case of Scottish Newtonianism

In late seventeenth- and early eighteenth-century Scotland the unity of philosophy was typically conceived in a Newtonian framework that postulated the primacy of experimental natural philosophy. In Query 31 of the *Opticks* (which first appeared in the 1706 Latin edition), Newton formulated his legacy for moral philosophy in a frequently-quoted sentence: "if natural Philosophy in all its Parts, by pursuing this Method, shall at length be perfected, the Bounds of Moral Philosophy will also be enlarged." According to Newton, this enlargement should proceed through the perfection of natural philosophy, which consists in its increasing contribution to our knowledge of the attributes and intentions of God:

> For so far as we can know by natural philosophy what is the first cause, what power he has over us, and what benefits we receive from him, so far our duty towards him, as well as that towards one another, will appear to us by the light of nature.[21]

This self-understanding of natural philosophy was quite unlike that of modern science: it did not aspire to a descriptive, explanatory and secular knowledge of nature – it also had intrinsic moral and theological content and implications.[22]

For Newton, the derivation of moral and theological knowledge from knowledge of nature was possible because for him the laws of morality, unlike the laws of nature, did not depend on God's volition. As Peter Harrison puts it, for Newton God "wills good things – things are not good because God wills them".[23] And as Newton himself says, God is "freely willing good things [...] and constantly cooperating with all things according to accurate laws, as being the foundation and cause of the whole of nature, except where it is good to act otherwise".[24] Therefore, not the presupposition of God's inexplicable will, but his goodness should be our guide in understanding nature. Newton's inquiry is all about God's creation: it is an inquiry by which we find out about his intentions and so about our own duty. By the analysis of phenomena we find the laws of physics, and as these laws reflect God's will and God wills good things, *a fortiori*, the laws of physics must concur in the production of good effects.

Newton did not take decisive steps to fulfil this vision of disciplinary unity, but he clearly formulated a task and a framework for Newtonian moral philosophers: to refine moral philosophy within the methodological *and* theological framework that his natural philosophy had set. Due to this heritage many Scottish natural and moral philosophers were willing with David Fordyce to "Consider nature or the World as the Volume or Book of God in the meanest page of which his perfections are legible".[25] Having been committed to this understanding of the world, Colin Maclaurin in his influential mid-century introductory text to the ideas of Newton's *Principia* also insisted on the representation of natural philosophy as an enterprise "subservient to purposes of a higher kind, and is chiefly to be valued as it lays a sure foundation for natural religion and moral philosophy".[26] The elaboration of the implications, as well as the critique, of

Newton's program for philosophy was left to the next generations, and many Scottish philosophers were willing to take up the Newtonian torch.

One of the most self-conscious Scottish Newtonians, George Turnbull in his *Principles of Moral and Christian Philosophy*, published in two volumes in 1739/40, makes an attempt to set the principles on the basis of which moral philosophy can be made out to be continuous with the program of Query 31.[27] Turnbull's central idea is this: regular and orderly appearances are due to the rule of laws in nature, and their physical explanation is given if an effect is subsumed under physical laws. Some of these laws are such that produce "good, perfection and beauty" in the material world, and an effect is thus instantly accounted for morally once it is shown to be produced by such laws. Explaining phenomena in this way is the *part* of natural philosophy that can be called moral philosophy. Just as Newton envisaged, the perfection of this part can proceed only through the refinement of natural philosophy, and our knowledge of the final causes that it provides.

Probably writing under the influence of Colin Maclaurin, Turnbull proclaims that

> all the conclusions in natural philosophy, concerning the order, beauty, and perfection of the material world, belong properly to moral philosophy; being inferences that respect the contriver, maker, and governor of the world, and other moral beings capable of understanding its wise, good and beautiful administration, and of being variously affected by its laws and connexions. In reality, when natural philosophy is carried so far as to reduce phenomena to good general laws, it becomes moral philosophy; and when it stops short of this chief end of all enquiries into the sensible or material world, which is, to be satisfied with regard to the wisdom of its structure and oeconomy; it hardly deserves the name of philosophy in the sense of Socrates, Plato, Lord Verulam, Boyle, Newton, and the other best moral or natural philosophers.[28]

So moral philosophy begins where the *conclusions* of natural philosophy are reached. The conclusions themselves are already part of moral philosophy, because they are related to order (beauty, good, and perfection) of the material world. Precisely for this reason they have constitutive reference to moral laws, just as they are bearers of theological content with respect to the design and government of the universe.

The unity of various branches of philosophy so conceived amounts to more than a mere congruence of vague methodological pronouncements: it arises from the very nature of the subject matter common to these branches. As Turnbull himself puts it, unity arises from "the nature of things" as the material world had been created purposively "for the sake of the moral world", so that they "make one strictly, connected system".[29] On the basis of this view of the world Turnbull even goes almost as far as endorsing a view akin to Berkeley's idealism when he says that the material world "considered apart from its effects upon perceptive beings, hath no existence" – and he only slightly qualifies this strong metaphysical commitment by adding the proviso that "at least, cannot be said to merit existence".[30] There is thus a *constitutive* reference in the material world to the world of perceptive and moral beings, a reference without which the material world cannot be accounted for.

It is thus not a bottom-up unity that Turnbull envisages for philosophical disciplines that is secured by the foundational disciplines of natural philosophy. Instead, in his vision natural, moral and religious insights have a mutual reliance on one another: the study of the natural world presupposes perceptual and psychological capacities that can be studied both as phenomena of physiology and as distinctively human phenomena of moral philosophy or a "science of man". The unity and mutual dependence of these aspects of the world as studied in natural, moral and theological branches of philosophy are underpinned by the fact that the world is *fit for purpose*—that it is adapted to a certain end.

This teleological unity of the world is also reflected in Francis Hutcheson's 1742 lectures on moral philosophy that prescribes search for the purposes in our constitution for which God and nature have "formed us".[31] Hutcheson also finds a motivation for natural philosophy in studying what "these things are which our natural senses {or perceptive powers} recommend to us", and his vision of unity is consonant with

Turnbull's. And so is Fordyce's influential *The Elements of Moral Philosophy* (1754), widely used as a textbook, in which he introduces philosophy as a descriptive enterprise that aspires to the knowledge of things "whether natural or artificial, by observing its Structure, the Parts of which it consists, their Connection and joint Action". This descriptive knowledge of the "Constituent Principles" that things follow in the course of their normal functioning directly leads to knowledge of their "Office and Use", which in turn leads to knowledge of the "common Effort or Tendency of the Whole".[32]

So the dominant vision concerning the unity of philosophy conceives the union of various branches of knowledge against the background of final causes with theological and normative aspirations. In this context David Hume's account of human nature in the *Treatise* is outstanding because his vision of unity avoids theological aspirations and aims exclusively at a secular and explanatory "science of man". For Hume, the unity of philosophy is conceived primarily by the means of method, and not against the background of final causes or teleological considerations.[33]

Yet, for the world of living organisms he retains some of the rhetoric of the mutual dependence of parts for a common purpose,[34] and due to his frequently emphasized preference for the methods of anatomy while exploring human nature,[35] a similar, functionalistic and synoptic outlook is characteristic to his account.[36] The conclusions reached in this inquiry allow for drawing further conclusions about what is good or useful for this particular constitution called human nature, and this can result in normative considerations on how to act in various situations, or how to change the circumstances so as to ensure in a given situation the desirable action of those involved.[37] But it certainly does not allow drawing conclusions concerning the nature or intentions of the deity.[38]

To wit, the unity of philosophical inquiry was just as popular an idea among natural philosophers and physiologists as it was with moral philosophers. As part of a wider European tendency,[39] this idea found its way into an increasingly vitalistic conceptual framework. Vitalistic ideas increasingly populated various branches of natural philosophy in Scotland from the early decades of the eighteenth century. As a consequence the sharp distinction that mechanical philosophies had drawn between mind and matter has been blurred,[40] a development that could provide further support

for the idea that various branches of philosophy are united by the intricate connections among their respective subject matters. It is in this context that John Gregory could conclude in 1770 that

> [t]he laws of union between the mind and body, and the mutual influence they have upon one another … is one of the most important enquiries that ever engaged the attention of mankind, and almost equally necessary in the sciences of morals and of medicine.[41]

The search for the laws of psychophysical unity connected the field of human physiology to morals and religion. In very much the same manner as Maclaurin understood natural philosophy as being subservient to purposes of a higher kind, George Cheyne, the fashionable Scottish doctor, proclaimed in 1724 that

> [t]he infinitely wise author of nature has so contrived things that the most remarkable rule of preserving life and health are moral duties commanded us, so true it is, that 'Godliness has the promises of this life, as well as that to come'.[42]

So conceived, medical research contributes to fulfilling our moral duty and transcendent aspirations by preserving our health in accordance with God's commandments, and it also helps us understand the world better by explaining what our creator has actually intended to us.

The interconnections among various branches of philosophy are thus not ensured by one-way influences, but as most authors emphasize, they constitute a system of mutual dependencies. Irrespective of the widespread reference to a theological framework, the central point of these visions, as is commonly acknowledged by natural and moral philosophers, is an aspiration to gain knowledge of "the nature, laws & connections of things, … & from thence deduce rules for the conduct & improvement of

human life" –[43] that is a comprehensive account of the world of dead and living matter, of morals and, to most philosophers, of God.

Anger and the Conceptual Unity of Philosophy

Anger is in the forefront of theoretical interest in eighteenth-century natural and moral inquiry in Scotland:[44] it serves as a standard illustration in the medical, moral and theological discussions of fevers and violent active passions. As such it has been devoted acute attention in connection with various *physiological* phenomena, like e.g. circulation, the animal spirits and raging fevers. In the descriptive and explanatory "science of man", which can be placed as a middle-range theory mediating between physiological and normative (ethical and theological) considerations, anger is discussed in connection with benevolence, love, and other passions motivating actions, tempers and various appetites, as well as its role in art and poetry. In *ethical* contexts it is discussed, in a typically condemning manner, among moral faults, in the context of corrupting the mind; and in *theological* contexts, it is considered as a passion demolishing humility. But sometimes it is also painted with more appealing colours as a state of mind necessary for the exercise of certain social virtues and self-preservation.

Now I will illustrate the unity of philosophical discourses on anger and show on this concrete example that these discourses are not independent of one another, quite the contrary: various moral and natural philosophical discourses penetrate each other, linking moral philosophies to then-contemporary medical theories, and *vice versa*, lending medical theories moral and theological significance. Therefore the discourses of anger in this period are eminently suitable to illustrate the thesis that there is an intimate and remarkable conceptual connection between the discourses of natural and moral philosophy in the period.

Anger is probably ideal for the illustration of how a phenomenon can travel through and connect various disciplines, and find its way to various descriptive and normative discourses revealing a remarkable conceptual unity among them. Physiology

and the "science of man", understood as a theory on the mind and society of moral beings, aspire to a descriptive and explanatory account of what anger consists in and how it is situated among other phenomena of the human frame and condition. In normative moral and theological contexts the questions concern the moral standing and the proper attitude toward anger, and its place in God's creation. These discourses, as one might expect on the basis of what we have seen above, indeed penetrate each other: *prima facie* descriptive discourses are filled with moral significance and theological connotations, and at the same time physiological ideas also enter moral and religious contexts.

That physiology and descriptive psychology are mutually relevant to each other was obvious to many, once vitalistic ideas concerning the union of mind and body became common currency. It was gradually acknowledged that living bodies should be studied differently from the non-living parts of nature, because animal economy is not just mere mechanism and living bodies are not Cartesian automata for which iatromechanical outlook is the proper approach and whose activity is derived from some mental substance. The psychological discussion of cognitive functions was therefore underpinned by, and conjoined with, the physiological discussion of living functions, and eventually it would drive toward a unified account of mental and physiological aspects of human beings, and abandoning the image of man advocated by substance dualists.[45]

This approach might have seemed even more natural for affective functions and faculties, simply because much more than cognitive faculties they were perceivably accompanied by bodily symptoms and processes. Anger is a phenomenon that aptly illustrates the mutual dependence of the affective and physiological realm, because it has a place both in the physiological category of "raging fevers" and in the psychological category of "violent passions". From a physiological perspective, anger in its primary form was typically conceived as an acute disease. As Cheyne put it:

> Hatred, for example, anger and malice, are but degrees of a frenzy, and a frenzy is one kind of a raging fever. From all which it is plains the violent and sudden

> passions, are more dangerous to health, than the flow and Continued, as acute diseases are more destructive than chronical.[46]

Anger is thus represented as a condition with destructive consequences on the human body. So, if people are concerned about leading a healthy life then the excesses of passions should be avoided, because these excesses are as dangerous to "the preservation of integrity of their intellectual faculties, or the bodily organs of them" as are the "excesses in high food, or spirituous liquors".[47]

Cheyne had an explanation of the destructive consequences of anger primarily in terms of bending and stretching the nervous fibers, violently speeding up the circulation of blood and bodily juices, and blocking secretion. This line was also followed several decades later by William Cullen when he proclaimed that "[a]mong the causes increasing the force of the Circulation, anger and other violent active passions are to be reckoned",[48] which is due to the influence of the brain's energy upon the heart.[49] This process can have potentially destructive consequences "in urging not only previous determinations with violence, but also in urging to excess inequalities, otherwise innocent."[50] The physiological consequences of anger can be so excessive that they constrain conscious agency by limiting "the power of reasoning or choosing means to ends",[51] but Cullen doubts that this disease typically entails a lasting or "desperate" condition of the brain.[52]

Very much within the sphere of Scottish intellectual influence, albeit without Scottish origin,[53] Richard Mead devoted his *Medica Sacra* (published posthumously in 1755) to an enlightenment project of naturalizing the spiritual diseases as represented in the Bible. His central point is that "the divinity ought not to be made a party concerned in imposing diseases, which may possibly have natural causes,"[54] and he undertakes the task of "removing vulgar errors, especially those related to religion"[55] by giving medical explanation, and suggesting cure for Biblical diseases, most importantly "daemoniacks", i.e. demonic possession. On Mead's diagnosis, the symptoms associated with this condition are just those of *madness*, "a disease of an injured imagination, which derives its origin from the mind, having been too long a time fixed on any one object".[56]

Anger, whose physiological description in Mead is also couched in terms of increased circulation,[57] is a principal cause of madness, because as he says elsewhere, "inordinate affections, dwelling long on the mind, frequently become tedious diseases", which reflect their respective natures, and if untreated, "anger ends in fury and madness".[58] So, anger comes in two forms, and for Mead, unlike for Cheyne, it is more dangerous in its chronic than acute version, because the former has a capacity to develop into a serious mental disorder.

The typical tone in which moral philosophers discuss anger is in tune with the medical discourse in emphasizing its destructive consequences for body, mind and society. Turnbull concurs with the physiological discourses of anger when he describes it as a "boiling, scorching fever".[59] As such it is a source of misery of the body, and it also belongs to the group of "evil passions, which sadly degrade and corrupt the mind".[60] So anger is both a moral *and* a medical condition that cries for cure. Hutcheson also agrees, that these passions are "immediately uneasy and tormenting", and "we are the worse for them",[61] and therefore it is a *duty towards ourselves* to restrain these passions.

Anger is also a disease of society, and not only of the individual mind and body. The anti-social consequences of anger and similar violent passions are in the forefront of theoretical interests already on the threshold of the Scottish Enlightenment. Gershom Carmichael, approving the Stoic understanding of anger as "short insanity", emphasizes that anger has the most "unsocial" consequences, and recommends refraining from action "in a state of blazing" and diligence in "restraining our anger".[62] Carmichael's legacy is reflected in Hutcheson's approach; he defines anger as a violent "Propensity to occasion Evil to another, arising upon apprehension of an Injury done by him".[63] As such anger is essentially an anti-social, "Selfish Passion", whose satisfaction yields "Pleasures opposite to those of the publick Sense".[64] Anger therefore drives us in the opposite direction than benevolence. Nevertheless, Hutcheson warns against taking the presence of such selfish passions as an indication that due to "the great and good" God's intentions "men have not been equipped by nature for social life". Anger and related passions arise only in the context of "conflict of interests, rivalry, jealousy, or by some thought of previous injury or cruelty," so albeit destructive of social bonds, these passions are only secondary to natural benevolence.[65]

Because we are aware of its potentially destructive consequences, anger is thought to preclude a sympathetic response of bystanders. Although sympathy is a faculty of human nature that facilitates the communication of affections, it works in the reverse way with anger and the like passions precisely because they are anti-social. As Adam Smith explains in his *Theory of Moral Sentiments* (1759):

> The hoarse, boisterous, and discordant voice of anger . . . inspires us with either fear or aversion. We do not fly towards it . . . It is the same case with hatred. Mere expressions of spite inspire it against nobody, but the man who uses them. Both these passions are by nature the objects of our aversion. Their disagreeable and boisterous appearance never excites, never prepares, and often disturbs, our sympathy.[66]

For this reason the imitations of anger and similar passions can be very moderately exploited in artistic creation, as it could facilitate at most a "very strange entertainment".[67]

Henry Home, Lord Kames explains the underlying mechanism in greater detail in his *Elements of Criticism* (1762): anger is "so far from causing any emotion similar to themselves, to incite a spectator to imitation, that they have an opposite effect" even if it is moderate.[68] In Kames's account this feature of anger arises from the fact that its expression puts the audience on the defensive, and therefore the one expressing anger invites a negative moral judgment on oneself: he is duly condemned for abandoning the standards of good taste and stepping outside the community of amiable men – a social consequence best avoided by a preventive cure.

Cures for Anger

Due to its potentially destructive consequences for body, mind and society, anger needs to be treated, but the suggested cures are different according to the outlook and temperament of the therapist. We have seen that anger is both a medical and a moral condition, it is as much a fever as an evil or selfish passion, and as such it is a *vice* for which the agent is to be held responsible and consequently he loses our sympathy. "Sudden passionate motions of anger" are listed in Hutcheson's *System of Moral Philosophy* as middle-range vices, less vicious than original malice, impiety or selfish design, but more vicious than partiality, or weakness when facing temptations or threats.[69] Therefore it is immoral to cure acute anger by unleashing it for taking revenge, and it is also psychologically inadvisable because, as Turnbull points out, "when their end is accomplished, what else is it but a short-lived relaxation from the most tormenting pain, which is quickly followed by remorse and just fears?"[70]

The suggested cures for anger also depend on the guise under which it is represented in various discourses, but one consensual way to avoid anger as a violent passion is preventive: one should have "well regulated affections" which could save us from vice, the mind's "greatest enemy, as well as debaser" and which can keep "its health and peace".[71] So, anger considered as a psychological problem can be prevented if we "strengthen as much as possible, by frequent Meditation and Reflection, the calm Desires".[72] An alternative route could lead through

> [t]he love of God, as it is the sovereign remedy of all miseries, so, in particular, it effectually prevents all the bodily disorders the passions introduce, by keeping the passions themselves within due bounds; and, by the unspeakable joy, and perfect calm, serenity and tranquillity it gives the mind, becomes the most powerful of all the means of health and long life.[73]

Preventing anger is the best way of avoiding all the unwelcome consequences of this condition, and it also has the side effect of strengthening the mind and body in general.

If prevention proves to be unsuccessful, then in acute cases some rational reflection can help, at least in Hutcheson's treatment. Given that anger is a self-centered passion, it can be cured if one realizes that it arises from a "partial View of publick Goods", i.e. a biased misrepresentation of intentions, actions and their consequences.[74] If put in the proper light, it becomes apparent that anger arises typically from "ignorance or accident":[75] if we "force our Minds to examine the *real Springs* of the resented Actions",[76] and contemplate our selfish passions by giving "just ideas of their objects",[77] we will find, more often than not, that the action giving rise to our anger is not due to malice but to "selfish Temper" for which the author of the action is to be pitied rather than hated, as it is "really more pernicious to himself than to others".[78] So the grounds of anger largely disappear, if the action that gives rise to it is contemplated from a broader, moral point of view.

Mead is more interested in chronic and pathological cases for which he suggests both psychological and medical treatment. From the medical angle the task is to reduce increased circulation, because the right treatment requires the "disorderly motion of the animal spirits […] to be calmed". This can be achieved by blood-letting, blisters, setons or the cooling of the head, but in more severe cases taking medication like myrrh, galbanum, camphor or niter can also be suggested. As for its psychological treatment, Mead suggests not to investigate the causes of anger, quite the contrary: the patient should turn his attention to "thoughts directly contrary to those, which possessed it before" in order to bring his mind out of the state it was in before.[79]

The emphasis in all these suggestions falls on therapies and techniques that could foster a physiological *and* affective equilibrium in individuals that live in a social world of conflicting interests and aspirations that provides ample occasions for anger. Patrick Coleman's point about the enlightenment debates on anger on the Continent can be driven home in the Scottish context as well: these theories directly relate to practical issues about the range of behaviours that are compatible with a cohesive society, about how people respond to one another, and how they understand themselves.[80] The therapies that facilitate the maintenance of a harmonious inner world serve the purposes of peaceful and virtuous social coexistence. From this perspective physiological, psychological and sociological diagnoses are subservient to, and are

unified with, moral, social and sometimes religious agendas.

It is precisely the awareness of the social and religious significance of anger that eventually leads to a more balanced account of the phenomenon in several authors. Despite the overwhelming negative rhetoric of anger as a disease, mental disorder, vice and threat to the sociability of mankind, the very same authors are frequently sensitive to the function of anger in society and in God's creation.

Hume in the *Treatise* discusses anger as a natural ingredient of human affective constitution. He is not concerned with an evaluative account of anger as a vice or as a threat to society; instead, he provides a naturalistic and phenomenological account of how anger is related to other passions, what role it plays in the motivation of action, and what its functions are in the context of human coexistence. For Hume, moderate anger is a normal and necessary constituent of our moral constitution:

> We are not, however, to imagine, that all the angry passions are vicious, tho' they are disagreeable. There is a certain indulgence due to human nature in this respect. Anger and hatred are passions inherent in our very frame and constitution. The want of them, on some occasions, may even be a proof of weakness and imbecility. And where they appear only in a low degree, we not only excuse them because they are natural; but even bestow our applauses on them, because they are inferior to what appears in the greatest part of mankind.[81]

Maybe because Hume primarily aspires to a naturalistic theory, and he has no normative moral commitments that precede his descriptive account of human nature,[82] he refrains from a condemning tone on anger. As a consequence, he does not see a problem with communicating anger, just like any other passion, via sympathy: unlike for Kames and Smith, anger for Hume is a passion whose communication "takes place among animals, no less than among men".[83]

But Hume is not alone with this insight: Hutcheson and Turnbull are even more detailed in explaining the positive role anger plays in the context of human sociability. The core idea, as Hutcheson puts it, is that "[o]ur *Anger* itself is a necessary Piece of

Management, by which every pernicious Attempt is made *dangerous* to its Author."[84] This idea is also implicit in the Hume passage above, but Turnbull explains it in great detail in terms of its teleological, one could almost say: evolutionary function. For him anger is a useful "instinct" that is "in reality the necessary operation of self-defence". Anger in its primary form is "momentary", it is a reaction against "natural evil" or someone's intention to harming us. As such it operates without reason, and it should be so because without government there is no time to deliberate when "sudden resistance is the only security".[85]

Reason itself can give rise to a different kind of anger when contemplating injustice. This kind of anger is a reaction to "moral evil", and in this sense it has "an inseparable connexion with the sense of virtue", because it is a desire of having the vice punished – and it is, as Turnbull warns us, "by no means malice". In this sense anger is not at all a threat to society, quite the contrary: "it is one of the common bonds by which society is held together: a fellow-feeling which each individual has in behalf of the whole species, as well as of himself."[86] This moral anger is however weaker than the natural because the latter is induced by harm intended towards ourselves, and our regard for ourselves is much greater than our regard for society or mankind.

So anger for Turnbull is a phenomenon with many faces. It is true that it is a medical and psychological condition, a fever that corrupts the mind, and it is also an evil passion that must be constrained, but at the same time under the relevant social circumstances (i.e. without central government) it is a natural means of self defence, and in its higher form it can even be genuinely moral – and taken as such it is a genuine virtue and not a vice. Moral anger, however, is not a selfish passion, it arises from the violation of public good, and its aim is not taking revenge but due punishment.

Although Turnbull's account is evolutionary in the sense that it explains why and how anger is necessary for survival and the moral stability of society, it is thought to function under the auspices of divine providence. Turnbull alludes to God's design by emphasizing that there is a "reason and end" for which "men was made liable to this passion", namely "to prevent and remedy … injury".[87] For Hutcheson, too, anger is part of human nature due to divine contrivance, and as such it responds to the needs of living in a society of conflicting interests arising from the self-love of individuals. Under

such circumstances "[t]here could not … be a wiser contrivance to refrain injuries than to make every mortal some way formidable to an unjust invader, by such a violent passion."[88] Anger has thus found a way from the discourses of a disease and vice to the discourse on the signs of divine providence.

From Unity toward Disunity

As illustrated above, anger is a phenomenon that travelled back and forth various discourses of human nature in the Scottish Enlightenment. As Thomas Dixon have pointed out, the concepts and categories of these discourses, in our case 'passions', 'affections', 'self-love' and so on, are common currencies of physiology, moral philosophies and theology.[89] Due to the common conceptual resources these disciplines not only studied the same phenomena, but they discussed them in the same language, and as a consequence they drove toward their unified account. Thus anger is a ranging fever, but as such it was not only a physiological and psychological phenomenon, but it also had moral significance as a violent passion, which quickly turned into a vice disagreeable to God and society.

Cheyne is perhaps an ideal example of integrating all these aspects in a single account: in his hands anger is an acute disease, avoiding it is a moral obligation, a duty toward ourselves, and the love of God is its best preventive cure. But even those not dwelling on all aspects of anger are aware of the various contexts in which the same language is applied. Turnbull, for one, seems to be similarly well versed in the physiological, psychological, moral and religious discourses of anger, and paints a fairly balanced picture of it, albeit hardly discussing its physiological facets. But the same language is spoken by those not especially sensitive to the moral and religious implications of physiological processes, like Cullen.

Anger is thus a phenomenon through which a remarkable conceptual unity among early modern disciplines of human functioning could be illustrated. Through this concept various aspects of human functioning had been represented as aspects of an

organized unity. One consequence of this representation was the increasing tendency of naturalizing the spiritual, moral and psychological aspects of human beings by showing the physiological correlate of these aspects. For most authors the point of this naturalization was driven home in the context of Newtonian *natural theology*: by exploring the various aspects of the human frame and their interconnections the design and intentions of God could be explored. Mead illustrates this stance clearly, who thinks that his naturalizing project should not erode belief in divine power, as it is not less "manifested by the cure of the most grievous diseases, performed in an instant at his command; than by the expulsion of evil spirits", because restoring "firmness and flexibility to relaxed and contracted nerves" or "changing the properties of the elements" testify both God's omnipotence and presence in the world. [90]

At the same time, the continuity of these discourses also provided an inspiration in the opposite direction, namely that of *secularization*. In the present context Hume and Cullen are interested in naturalization without paying attention to religious consequences. Hume made explicit the epistemological reasons of his refusal to extend the conclusions of either moral or natural philosophy to implications on transcendent matters: our cognitive apparatus is so limited that we cannot expect epistemic benefits from such inquiries.[91] Hume's ideas influenced Cullen's methodology and metaphysics for chemistry and physiology, and as a possible consequence he also refrained from drawing moral or religious conclusions from natural inquiry. [92] This reluctance is reflected in the telling irony in his explorations of the possible causes and treatments of gout. Although Cullen also mentions the "passions of the mind" among the occasional causes of gout, he refuses to speculate on possible therapies in this case, because "[h]ow they are to be avoided I must leave to the philosophers, or, if you will, to the divines."[93]

Hume sees the role of his descriptive anatomy of human nature quite distinct from that of the normative discourse of the moralist, and Cullen similarly, but in a more reserved tone, separates his physiology from the questions of normative ethics and theology. So, despite the language they share with those forging a common framework for human phenomena from natural philosophy to theology, Hume and Cullen turn away from normative and religious connotations of the study of human phenomena. By distancing the discourses of anger and other passions from theological considerations,

they implicitly challenged the foundations of conceptual unity. So, beside the conceptual unity of the discourses of anger, the tendencies to dissolve this unity and the drive toward disciplinary differentiation have been given a crucial impetus.

II. The Methodological Unity of Scottish Newtonianism

For the Scottish Newtonians the method of analysis and synthesis provided a framework that, beside conceptual interconnections of the kind discussed above, also served to maintain the unity of moral and natural philosophy. As Newton summarized in his influential Query 31 of the *Opticks*:

> analysis consists in making experiments and observations, and in drawing general conclusions from them by induction … By this way of analysis we may proceed from compounds to ingredients, and from motions to the forces producing them; and in general, from effects to their causes, and from particular causes to more general ones, till the argument end in the most general. This is the method of analysis, and the synthesis consists in assuming the causes discovered, and established as principles, and by them explaining the phenomena proceeding from them, and proving the explanations.[94]

So analysis is either a resolution of "compounds to ingredients" or "motions to the forces producing them". It has a focus on the search of causes, and once found, on their explanatory use.

In the *Principia* this method is focused on motions and forces producing them, and there "the basic problem of philosophy seems to be to discover the forces of nature from the phenomena of motions and then to demonstrate the other phenomena from these forces".[95] This problem is to be solved by mathematical means, by conforming to, what I.B. Cohen termed "the Newtonian style". This meant more than deriving numerical results from experiments, or a focus on measurement, or a commitment to a way of exposition that proceeded from definitions and axioms: It also meant taking mathematics as the model of reality: constructing "the mathematical analogue of a natural situation", and then to advance from this idealized case by the addition of further conditions toward more accurate mathematical analogues of actual situations.[96] In this framework, Newton's axioms or laws of motion do not serve the purposes of

explanation and prediction directly, but function as "inference-tickets" that allow for drawing conclusions from motions to forces, and *vice versa*, and from macrophysical to microphysical forces composing them.[97]

The *Principia*'s project is thus to search for a specific, quantifiable natural kind, i.e. force, in the background of phenomena, and not interested in qualitatively different components. The method of analysis of "compounds to ingredients" belongs to the project of the *Opticks*. The two different ways of analysis-synthesis that are applied in the two works reflect different aims and different methodological commitments. The fact that in Query 31 Newton mentions two different ways of analysis seems to reflect the failure to extend mathematical analysis to all optical phenomena. This anomaly is perhaps the most obvious in the case of colors, where he had to give up his initial hopes for a demonstrative mathematical exposition that he had achieved for fits and refrangibility.[98] This might motivate Newton's permission for qualitative analysis as a route to explanatory principles;[99] especially if we bear in mind that he contemplated the possibility of accounting for optical phenomena as chemical phenomena.[100]

In the *Opticks* the method of analysis is not mathematical but analogical: Newton proceeds by the observation and comparison of different rays of light with respect to various properties like "refrangibility, reflexibility, and colour, and their alternate *fits of easy reflexion* and *easy transmission*".[101] As Newton had to give up the project of revealing all the optical properties of surfaces in relation to different colors, the hopes for mathematizing color phenomena arising from reflection and refraction withered away too. Eventually he had to allow for an experimental decomposition of white light into its component colors, but stop short of giving it full mathematical treatment in terms of motions and forces acting on light corpuscles.[102] Therefore the qualitative differences of differently colored rays of light persisted in Newton's treatment, and this fact gets reflected in the methodological pronouncement of Query 31.

Newtonian Analysis and Synthesis in Moral Philosophy

Let us now turn to the question of how Newton's methods of analysis and synthesis were turned into a methodological tool for the integration of moral to natural philosophy. Francis Hutcheson may be credited with an attempt to implant the *Principia*'s "Newtonian style". His *Inquiry into the Original of Our Ideas of Beauty and Virtue* (1725), was originally subtitled as "an Attempt to introduce a Mathematical Calculation in Subjects of Morality".[103] And indeed, Hutcheson attempted "[t]o find a universal Canon to compute the Morality of any Actions, with all their Circumstances", and laid down the "axioms" of such complex calculations as first steps towards "applying a mathematical Calculation to moral Subjects" that was supposed to be "further pursu'd" in this way.[104] On these pages Hutcheson represents morality as essentially mathematical and calculable, and provides, as it were, the mathematical principles of morals.[105]

Having defined benevolence that extends over the whole of humankind as the "universal Foundation of our Sense of moral Good, or Evil",[106] Hutcheson unites all virtue in this single one that is supposed to provide the uniting force of the human world analogous to gravity in the natural world:

> This universal Benevolence toward all Men, we may compare to that Principle of Gravitation, which perhaps extends to all Bodys in the Universe; but, like the Love of benevolence, increases as the Distance is diminish'd, and is strongest when Bodys come to touch each other. Now this increase of Attraction upon nearer Approach is as necessary to the Frame of the Universe, as that there should be any Attraction at all. For a general Attraction, equal in all Distances, would by the Contrariety of such multitudes of equal Forces, put an end to all Regularity of Motion, and perhaps stop it altogether.[107]

Benevolence, or virtue, is a calculable quantity which, in first approach, is "always directly as the Moment of Good produc'd in like Circumstances, and inversely

as their Abilitys: or B = M/A". By adding a further condition, the initial axiom is refined, and brought closer to actual situations: some of our actions are good to ourselves and harmful to the public, or *vice versa*. Therefore "the Virtue of the Action, or the Strength of the Benevolence" can be calculated as B = (M±I)/A, where "I" expresses the "Interest" or "Advantage" the agent obtains by performing the action, and it is calculated as "a compound Ratio of his Self-Love, and Abilitys", i.e. "I = S × A". If the action is harmful to the agent then it increases "the Strength of the Benevolence" of the action so it should be added to the "Moment of Good"; if it is advantageous to the agent, then it should be subtracted.[108]

Hutcheson's core idea seems rather Newtonian and *Principia*-style – even if it is rudimentary and much less refined if compared to the *Principia*'s elaborate mathematical apparatus. Hutcheson's approximation to an accurate mathematical description of the amount of Benevolence treated as an essentially calculable quantity is analogous to Newton's strategy of successive approximations starting from an idealized situation and refining it by the addition of further conditions. Similarly to Newton, Hutcheson builds his moral philosophy on mathematical calculation, and he provides the axioms to calculate unknown quantities from a set of previously established parameters.

Hutcheson is also eager to maintain the common theological framework of natural and moral philosophy. The spirit of Newton's famous dictum in the *Scholium Generale*, namely "to treat of God from phenomena is certainly a part of natural philosophy",[109] finds an expression in Hutcheson's introduction to moral philosophy, first published in 1742: "We must therefore search accurately into the constitution of our nature, to see what sort of creatures we are; for what purposes nature has formed us; what character God our Creator requires us to maintain. Now the intention of <God and> nature with respect to us, is best known by examining what these things are which our natural senses {or perceptive powers} recommend to us, and what the most excellent among them? and next, what are the aims of our several natural desires, and which of them are of greatest importance to our happiness?"[110]

Exploring God's intentions toward us through the study of nature is consonant in Newton and Hutcheson, and so is the commitment to empiricism in these

explorations: it is the study of nature through our senses that brings us closer to the knowledge of what we are intended to do and what brings us happiness. Other contemporary Scottish moral philosophers, as we have seen above, also share this religious and teleological perspective that promises to deliver knowledge of God, of the purpose of human beings, and aims to draw direct normative consequences concerning our duty.[111]

Turnbull is another bearer of the Newtonian torch in Scottish moral philosophy. Mathematical spirit, albeit not mathematical calculation, is central to Turnbull's vision. In the spirit of Newtonian "mixed mathematics", Turnbull identifies his approach as "mixed moral philosophy" which is "an account of human nature, mixed of principles inferred from immediate observation, and others deduced from such principles, by reasoning from ideas or definitions".[112] Elsewhere he gives a hint as to how to understand that part of moral philosophy which "bears very nearly the same relation to morals (by which let me be understood to mean the whole of philosophy relating to human nature and human affairs) that mathematics bears to natural philosophy", i.e. the part that is based on reasoning from definition and not from observation. This part "consists in investigating or demonstrating what moral qualities may co-exist, what must co-exist, and what are absolutely incompatible", and in the determination of their proportions.[113] Although this abstract, *a priori* part of moral philosophy does not form an "orderly system of universal truths" comparable to mathematics, yet moral philosophy is still modeled on the ideal of a Newtonian mixed mathematics.

Mathematics alone, however useful and foundational is imperfect for the purposes of moral philosophy, because "even natural philosophy, if it stop short of final causes, and the moral conclusions which evidently result from thence, is a very defective and imperfect science".[114] The task of moral philosophy is to proceed by a method of Newtonian analysis and synthesis consisting of reasoning from principles to effects and effects to principles, which explores the "general laws of our constitution" and thereby reveals man's "natural powers, end, dignity and happiness".[115] The abstract, quasi-mathematical part of moral philosophy is the guide of analysis here: a law will be established if it can be derived from the definition of "intelligence, volition, affection, habit, or any moral power" *and* if it is supported by universal experience. If phenomena

are found to conform to the definition of any moral power then the laws so established may be deployed in accounting for further phenomena arising from those powers.[116]

David Hume's science of man is congruent with post-Newtonian *Opticks*-inspired natural philosophy. The axiomatic-mathematical-quantifying outlook is entirely missing in Hume. And he takes pain to warn against the pretensions of mathematical certainty. If the actual practice of mathematics is concerned, mathematics turns out to be fallible and not the realm of unquestionable apodictic truths. Mathematics is a collective enterprise where certainty is constructed through social processes and not by the effort of reason:

> There is no algebraist nor mathematician so expert in his science, as to place entire confidence in any truth immediately upon his discovery of it, or regard it as any thing, but a mere probability. Every time he runs over his proofs, his confidence encreases; but still more by the approbation of his friends; and is rais'd to its utmost perfection by the universal assent and applauses of the learned world. Now 'tis evident, that this gradual encrease of assurance is nothing but the addition of new probabilities, and is deriv'd from the constant union of causes and effects, according to past experience and observation.[117]

So, even if Hume's metaphysics of knowledge teaches us that *a priori* reasoning concerning number is the realm of demonstrative certainty, on a different note he teaches that mathematics is also a cognitive enterprise whose dynamics is characteristic to the scholarly community. There is thus a distinction to be drawn between the *metaphysics* and the *practices* of mathematical knowledge: with respect to its nature mathematics is *a priori* and demonstrative, but the production of mathematical knowledge is a social process and belongs to communities – and communities just like individuals can be mistaken.

Hardly surprising then, that instead of analysing phenomena by mathematical means Hume's methodological emphasis falls on comparative analysis and analogical reasoning, which fits rather well into the *Opticks*'s framework: "experiments" should be

"judiciously collected and compar'd",[118] and the principles underlying them should be revealed "from the observation of several parallel instances".[119] Hume's way of using historical and everyday observations is therefore similar to Newton's use of experiment in the *Opticks*. They both proceed by comparing some phenomena, arriving at hypotheses by generalizing the findings, in Hume's words: "What I discover to be true in some instances, I *suppose* to be so in all".[120] And these are to be tested by carefully chosen experiments, or against seeming counterexamples, taken from history and everyday life or from a purposively created artificial setting.

The products of the analysis so conducted are the principles of various faculties, like perception, imagination, reason etc. whose interaction results in ideas and impressions causing behaviour, but their contribution can hardly be measured and the principles of their interaction can hardly be quantified – not even in principle. So their relations cannot be represented in an algebraic way, in terms of relations of quantities either. Instead, they are *qualitatively* different principles of human nature, and the explanation of human phenomena consists in a description of how these principles with their distinctive characteristics figure in producing them.[121]

The possible inference from conclusions concerning our constitution to normative claims may seem similar to Turnbull's project. Yet, Hume's vision of progress for moral philosophy, unlike Turnbull's, does not proceed through the perfection of natural philosophy and through our knowledge of final causes. The science of man is the foundational science, as he proclaims it in the *Treatise*'s Introduction, as it will delineate possible claims of knowledge in other disciplines – including natural philosophy and religion too. As a consequence Hume's project eliminates claims aspiring to knowledge of transcendence, or more precisely: Hume takes pain to argue that our conclusions in moral and natural philosophy cannot be stretched to the intentions of the Deity.[122]

The Flight from Mathematics in Scottish Physiology

Let me now turn to the parallel methodological tendencies in Scottish natural philosophy, particularly physiology. Early in the 1690s the Edinburgh professor of medicine Archibald Pitcairne began working on placing medicine on a mathematical *cum* mechanical footing. As his *Principia*-style epistemological warning has it,

> our Knowledge of Things is confined to the Relations they bear to one another, the Laws and their Properties of Power, which enable them to produce Changes in some Things, and to become altered by other Things.[123]

It is thus only functional and dispositional properties through which knowledge of things is possible, not through their intrinsic natures: the study of structure and function are the key to understanding nature. Aspiring to knowledge of natures can only lead to speculation and endless disputes resulting in philosophical sectarianism. Instead of forcing experience and observation into the Procrustean bed of some sectarian metaphysics, they should be processed in a mathematical, and therefore demonstrative, disinterested manner.

Pitcairne's medical theory centred exclusively upon the circulation of blood and humours secreted from the blood, and he understood illness in terms of decreased circulatory hydraulics. He adopted the general laws of Newtonian mechanics in order to explain the functioning of body on an analogy drawn between gravity and the heartbeat. Although it seems he implicitly acknowledged short-range attractions and saw the limits of mechanical explanation in chemistry, his physiology remained within the boundaries of mechanical philosophy. However, he fiercely opposed its Cartesian variant by denying the explanatory significance of the particles' shape and size in his account of bodily functions, instead he invoked primary particles building up various molecules by mechanically inexplicable bonds.[124]

As Anita Guerrini puts it, Pitcairne's account was an exercise in demonstrating "mechanical necessity" by a "mathematical method". The tendency of Newton's natural philosophy to reify mathematics in a general account of motion was thus applied in the particular context of human physiology.[125] The main epistemic virtue of a mathematical method in Pitcairne's eyes was its *certainty*: unlike Paracelsian and Cartesian speculations, the Newtonian style was capable of producing demonstrative conclusions. So, for Pitcairne, the proper way of medical learning did not lead through the search for physical causes but in a deductive theory of medicine: instead of empirical hypotheses on the nature of causes he urged mathematical demonstrations of relations.[126]

By the 1720s and 30s the theoretical climate had been changed. The two editions of Newton's *Opticks*, the second edition of the *Principia* (1713), and the publication of his "De Natura Acidorum" (1710) are the milestones for the future development of Scottish chemical and medical theory. In this context the most important tenets of these writings are the idea of short-range attractions between particles of matter, which contributed to the dissolution of Pitcairne's rigidly mechanistic-mathematical framework,[127] the idea of aether in the form of a "certain most subtle spirit", and a general tendency that drives toward experimentalism and away from mathematical representation.

By the time of writing his most popular book, *The English Malady* published in 1733, George Cheyne, as well as other members of the Pitcairne's circle, had already distanced himself from his earlier commitment to a mechanical and mathematical treatment of animal oeconomy, and adopted a vitalistic stance toward the mind and body as united. Although he had been criticised for abandoning his earlier iatromechanical views already in his *Essay on Health and Long Life* (1724), he had not given up his self-definition, nor his reputation, as a Newtonian,[128] but by this time he had indeed given up the idea of writing the *Principia Medicinae* in which he intended to follow the *Principia*'s "Newtonian style".[129]

Having dismissed the idea of explaining physiological phenomena "from Matter and Motion alone, and all the powers of our Numbers and Geometry join'd to them" as "mere *Jargon* and *Ignorance*",[130] he now emphasized the unity of matter and mind, because "the Works of *Imagination* and *Memory*, of *Study*, *Thinking*, and *Reflecting*,

from whatever Source the Principle on which they depend springs, must necessarily require bodily Organs".[131] In his new approach, Cheyne exploited Newton's aether hypothesis in the *Opticks*:[132] as "MECHANISM takes Place and operates in it self only, on dead *Matter*", Cheyne proposes to study its concurrence and homology with the "*Self-active* Principle" to which mechanism is subordinated in "ORGANIZED bodies fit for *Animation* and living Functions".[133] In this enterprise he now advertised, in place of numbers and geometry, an analogical approach to the "Whole of *Animal Nature*" based on the insight that "we find always *similar* Effects have *similar* Causes", a principle without which "many Appearances in *Generation, Nutrition,* and *Animation*" would "otherwise appear unaccountable".[134]

By the middle decades of the eighteenth century, the scholarly community had grown much less enthusiastic about the prospects of the general applicability of mathematics to various fields of learning. Pitcairne, and some of his Newtonian allies like John Friend,[135] had been accused of making mathematics subservient to sectarian interest, and in connection with a controversy with Leibniz,[136] Pitcairne himself had been forced to realize that even Newton's *Principia* could be "orangically & Hanoverianlie abus'd".[137]

After the foundation of the medical school in 1726, Edinburgh turned into a centre of vitalistic physiology: William Cullen's chemical and medical investigations from the 1740s reflected a growing dissatisfaction with the extension of mechanical and mathematical principles to these fields. As his early nineteenth-century biographer, John Thomson noted, Cullen perceived that while earlier investigations "showed what might be achieved by mechanical principles and mathematical reasoning to physiology, indicated also what they were unable to accomplish."[138]

Cullen appreciated their explanatory potential for "phenomena depending on the *general* properties of matter",[139] yet he thought the mechanical hypothesis is ill-founded in chemistry, because he saw the reducibility of chemical phenomena, i.e. those related to the *particular* properties of substances, to mechanical phenomena far from being warranted, and he was unsure about its possibility – even in principle. For Cullen, there are phenomena unexplainable by reference to general properties: in order, for example, to explain how ice turns into water, mechanical accounts frequently return to

the supposition that heat changes the angular particles of solid ice into spherical ones of fluid water, the latter being more "easily moved, which is fluidity". But as we cannot deduce fluidity from spherical parts, nor *vice versa*, we have to appeal to some other cause,[140] which may not fit the ideals of mechanists. Therefore, seeking explanations in terms of mechanical philosophy for chemical phenomena is neither possible nor desirable. Should we be able to find a mechanical basis for chemical phenomena, it would still fall short of an explanation in terms of proximal causes.

Instead of mechanical and mathematical hypotheses, most of the explanatory work for Cullen's chemical enterprise is done by *elective attractions* that are to be described and classified on the phenomenal level, because their underlying causes are proclaimed to be unknown. Elective attractions thus become the cement of the chemical universe, but not in a sense modelled on Newtonian gravity: while gravity is a universal attraction, Cullen's elective attractions are selective and depend on the particular properties of substances and their relative attractions, and not on their density. The business of chemistry is thus to describe and arrange elective attractions systematically, and to account for various combinations and separations of substances in terms of principles established by such classifications.

On similar grounds, Cullen considered relying on exclusively mechanical principles equally problematic in physiology, not only because we do not perceive the mechanical means of our internal functioning, but also because a mechanical outlook cannot lead to satisfactory explanation in too many cases: the stomach, for instance, "does not seem by any mechanical powers to contribute" to the food's "division" while digesting; nor can the workings of the lungs be fully described in terms of the "mechanical powers of pressure."[141]

As Cullen sees it, Harvey's discovery of the circulation of blood gave an impetus toward understanding animal economy as a "*hydraulic system*", and thereby it contributed one aspect to its understanding as an "*organic system*", but this approach could not supply the mathematical means with which to study physiological phenomena.[142] And not only that: it also overshadowed the adequate complex outlook from which "the human system can only be viewed […] that is, as a *chemical mixt*, as a *hydraulic machine*, and as an *animated nervous frame*."[143] The combination of these

three points of view can make "the system of physic" complete, but two of which, namely chemical mixt and animated nervous system, are hardly susceptible of understanding in purely mechanical terms.

So, Cullen reluctantly acknowledges that the combination of Galileo's mathematical and Bacon's experimental approach had some role to play in the history of medicine: "we must observe, that whether it was with advantage or not, many improvements have been derived from mathematics to the system of physic: they have certainly contributed to put physic in the good condition in which it is at present."[144] But he also emphasizes that this contribution had been limited, and mathematics in medical matters cannot have a bright future, as "it neither could, nor ever can be, applied to any great extent; in explaining the animal economy".[145] Just like its mechanization, the mathematization of animal economy could not deliver the complete system it had promised, and for very much the same reason: only some parcels of medicine could be effectively treated this way.

The language of mechanism and mathematics, for Cullen, is thus not the universal language of nature. This insight inspired a closer understanding of what specific forms the internal activity of a living body may take, i.e. "the state and affections of the primary moving powers in it."[146] Most of the crucial bodily functions Cullen ascribes to the "mechanism of the brain" which could not fulfil its various functions "without being united with a sentient principle or mind that is constantly present in the living system."[147] Without there being such a principle not even the mechanical functions of the body could be adequately explained: how can the heart keep pumping blood without running down? For Cullen the explanation came from the brain and its close connection to the mind, the sentient principle responsible for the effects greater than the stimuli.

However, Cullen did not see this internal active force as centralized exclusively in the mind/brain, he distributed some of it throughout the various parts of the body: activity for him partly resides in the "inherent power" of the muscles. And thus, while the mind/brain is the central unit, some of the bodily activities depend on various local forces that together form an organic whole. Cullen's outlook is well represented in a telling passage:

> opium, alcohol, mephitic air, applied to our bodies, induce a state of sleep ; they are known to diminish the motions in general, and have got the appellation of sedatives. With regard to the chief of them all, opium, the question has been often put, *quomodo opium facit dormiret* and the variety of theories offered by the mechanical physicians has amounted to little more than that of the Galenists, *quia habet in se facultatem dormifaciendi*. It has been alleged by some, that opium coagulates, and by others, that it rarifies the blood; but we say, that opium produces its effect independently of the fluids and of their circulation. Whatever difficulties Dr. Haller has raised upon this subject, I say that the experiments of Alston, Whytt, and Monro, our colleagues, upon animals, after the circulation of the blood had ceased, are quite conclusive; that though opium acts slower, it most certainly does act, after all motion of the fluids have ceased; nay, that it acts upon every separate and detached part, even when the communication with the brain is destroyed, that it acts upon the inherent power, so that we need not discuss the matter whether it coagulates or rarifies the blood, as its direct operation is upon the nervous power, the mobility, sensibility, and irritability of which, it destroys in every particular part to which it is applied.[148]

Beyond the diagnosis that mechanists do not fare better than Galenists as far as the intelligibility of their explanations go, Cullen here is convinced that the effect of the opium is local and does not presuppose circulations in the body. Its effect is diminishing the characteristic activity of some part of the body by influencing its local "nervous power" which Cullen considered to reside in the relevant muscles themselves.[149] As such they belong to the "animated nervous frame", partly decentralised, which is itself part of a harmonious mechanical, chemical and physiological whole.

A Social History of Antimathematics

As I have sketched above, the methodological trajectory of Scottish moral philosophy and medical theory exhibit a similar trajectory that could be labelled as a flight from mathematics in the human sciences. Let me then finally turn to the question as to why mathematics fell increasingly into disfavour among the natural and moral philosophers of the Scottish Enlightenment. Arguably, the theoretical work of those studying various aspects of human phenomena reflected their respective social imagery, i.e. the way they more or less explicitly envisaged social order and governance, and the proper condition of human beings within these structures.

My main point is that those developing theories about human functioning, from physiology through the "science of man" to political contexts, had not only purely cognitive agendas but also a political one broadly understood: theories about various facets of human nature also served political purposes, and exhibited affinities to the social-political situation in which they originated, and gestured toward specific stances on questions of political and religious significance. So texts addressing problems of purely theoretical issues frequently had other layers of significance in the social-political-religious sphere, mainly through an alleged congruence of epistemic and political values.[150] Let me just focus on the role of mathematics here.

Anita Guerrini, Simon Schaffer and John Friesen have explored, Pitcairne's high esteem for mathematical learning did not arise exclusively in the context of his aversion to theoretical sectarianism in medicine, but also in that of religious and political sectarianism. The Glorious Revolution brought significant changes to Scottish society and academic life as a part of it. These included the ejection of Episcopal ministers because of their Jacobite sentiments and the restoration of Presbytarianism, and setting up a visitation committee in 1690 that was responsible for ensuring the allegiance of Scottish universities to the new government. As a consequence, Alexander Monro, the president of the Edinburgh University who labelled the process as "Presbyterian Inquisition", and several other professors had been expelled, but other Scottish universities fared even worse.

These experiences inspired Pitcairne, an Episcopalian, to write satirical plays, *The Assembly* and *Babel*, both written in 1692,[151] in which Presbyterians are represented as dogmatists taking the word of the scripture at face value, and religious enthusiasts undermining the significance of reason. Presbyterianism is thus portrayed in these plays as a form of anti-intellectualism that opposes mathematical medicine and natural philosophy in the name of a narrow-minded scholasticism. Besides, Pitcairne's Jacobite sympathies are also transparent in these plays: the stubborn, sectarian Presbyterians are also enemies of the monarchy and hereditary right. In his eyes these views were liable to cause social turbulence and sectarian violence, and he proposed mathematical learning as the only useful way of fighting them. The language of the *Principia*, as opposed to the speculative tone of competing natural philosophies, was thus exploited in an extra-theoretical context, and it was presented as the ideal model for avoiding religious fanaticism, dissent and faction.

As a consequence of "Presbyterian Inquisition", Pitcairne and his friend David Gregory, professor of mathematics, also left Edinburgh: Pitcairne took up a professorship of medicine in Leiden in 1692. Gregory went to Oxford where was appointed as Savilian Professor of astronomy in 1691 on the recommendation of Newton. In Leiden a "Tory Newtonian" circle consisting of immigrant Scottish students formed around Pitcairne which included George Cheyne among others.[152] Gregory also had an influence on Scottish students interested in medicine, most notably on James Keill, still in Edinburgh, and on John Arbuthnot in Oxford.

In the 1690s all these medical men shared a common commitment to the extension of Newtonian natural philosophy, and especially its mathematizing tendencies to medicine, and with varying degree of commitment and publicity to the Jacobite cause. They shared Pitcairne's convictions: in their eyes mathematics, beyond its capacity to produce theoretical certainty, also served as a model of ensuring social hierarchy and stability, and the image of human functioning inspired by the Newtonian style provided useful theoretical and metaphorical analogies in the context of their Jacobite politics.

It was not unprecedented in early modern Britain to turn to the certainties of mathematics in politically turbulent times. In the mid-seventeenth century Hobbes, for

example, invoked the authority of geometry to secure universal assent in questions of philosophy, both "civil" and "natural", in a period of political and religious sectarianism.[153] In this Hobbesian manner William Petty developed his "political arithmetick" in response to the theoretical controversies generated by the English civil war: the representation of individuals and their social relations by mathematical means generated an air of disinterestedness that was very much strived for in a time of heated and sometimes violent discussions.[154] Hobbes' and Petty's theories and methods were not only motivated by religious and political considerations, but they could be exploited for apologetic purposes. The mathematization of society was congruent with the social imagery centred upon social stability and rule by coercion: knowledge was to be collected and processed so as to ensure the interests of and conformity to the central government. In the turbulent years around 1700, Pitcairne and his circle developed physiological theories that conformed to this image: a mathematically represented mechanical image of human functioning could do good apologetic service to the Stuart cause.[155]

By the mid-eighteenth century, in plausible connection with the changing social, political and economic situation, the intellectual climate in Scottland had changed, and anti-Jacobite ideologies could also find its expression from theories of nature to society. A new image of man started to take shape which conformed much better to the new social order emerging in the aftermath of the Glorious Revolution and Union of 1707 with England. This new image had been elaborated in terms of physiological, moral, social and economic theories that can be understood as commenting on and justifying the new, liberal form of governmentality that replaced the monarchical ideals and practices admired by those with Jacobite sympathies.

Politically, the Union eventually offered the stability that was very much strived for in Scotland. After two decades of economic depression the economy started to revive, and the benefits of the Union could be gradually felt. From the 1720s economic development opened up more optimistic perspectives in various fields of social life. The emerging new political and economic elites – especially Lowland Whigs, most notably the Argylls – were both supportive of and actively engaged in initiatives to reform universities, establish scholarly societies or improve agriculture. Their devotion to

philosophical and institutional issues was motivated by the need of catching up with England intellectually and economically, and in order to promote development in these fields they instituted a conscious policy of patronage.[156] This policy was focused on the *improvement* of various aspects of Scottish life and their active engagement in this enterprise lent them political legitimacy and served their political and social ambitions, particularly their struggle against religious fundamentalists and Highland clans, and it also contributed to their economic influence by the implementation of more refined technologies in agriculture, forestry and coal-mining. In this process the University of Edinburgh had been restructured and a medical school was founded in 1726. Within a few decades the newly founded medical faculty developed into a leading centre of medical learning in Europe comparable only to Montpellier, Halle and Leiden.[157]

The image of man developed both in mid-century Scottish physiological theories, mainly by Robert Whytt and William Cullen, and by those working on a "science of man", mainly David Hume, Adam Smith and Adam Ferguson, was informed by a different vision. This image is much less congruent with the ideals of monarchical than liberal forms of government: the drive for a mathematical, demonstrative and mechanical representation of human functioning had been abandoned by them in favour of a qualitatively oriented approach centred on the sensitivity of self-governing individuals. These theories posed a challenge to various aspects of the Jacobite ideology from its inclination to mysticism and "Highlandization" to its social imagery.

The flight from mathematics as a safe heaven in the human sciences can be related to the specific social and political context of early eighteenth-century Scotland. The weakening of the mathematical ideal took place in an atmosphere of general, i.e. political, economic and cultural improvement – a context in which sensibility, refinement and civility provided the fundamental categories of understanding human functioning. The problems of social stability, sectarian violence and the legitimate scope of monarchical power gradually faded away and gave way to the issues associated with economic, social and cultural backwardness.[158]

In this context the ideal of liberal government replaced that of the monarchical one: the image of self governing agents cooperating and being bonded together due to their natural sociability rather than coercion becomes central.[159] Against this

background a new image of man started to emerge with an increased emphasis on the sensitivity and affections of humans rather than on their calculable mechanical functioning subsumed under mathematical formulae.

It is not to say that the theories to be discussed here were unique in the European context and as such they are to be ascribed to the specific social-political context in which they developed. Enlightenment vitalism is a pan-European phenomenon, and not specific to Scotland or Britain. It is rather that in the Scottish context a special meaning can be attached to these theories as they provide support to a specific social imagery from outside political discourse. But the most important feature that distinguishes the developments in Scotland is that in a period of some four decades there emerged in the Glasgow-Edinburgh axis a continuum of theories ranging from the phenomena of nature to society that bear the traces of a vitalistic worldview. These theories, taken as a whole, provide an exposition of a *Weltanschauung* that took shape in this temporally and spatially local context.

Methodological and Ideological Context

III. Hume's Copernican Turn

David Hume considered his contribution to moral philosophy in his *Treatise* as amounting to a revolution comparable to that achieved by Copernicus in natural philosophy.[160] For Hume, a Copernican revolution in moral philosophy consisted in setting a new aim to the discipline and putting it on a new methodological footing.[161] The need for a revolutionary transformation that breaks up with the continuity of previous moral philosophies is expressed early in Hume's 1734 *Letter to a Physician* in which he complains about the disappointing status of the philosophical tradition his age inherited:

> I found that the moral Philosophy transmitted to us by Antiquity, labour'd under the same Inconvenience that has been found in their natural Philosophy, of being entirely Hypothetical, & depending more upon Invention than Experience. Every one consulted his Fancy in erecting Schemes of Virtue & of Happiness, without regarding human Nature, upon which every moral Conclusion must depend.

No wonder then that in moral and natural philosophy "there is nothing yet establisht […] & that they contain little more than endless Disputes, even in the most fundamental Articles." Overcoming this situation and improving the cognitive standing of philosophy required, in Hume's eyes, breaking new grounds in these disciplines with "a certain Boldness of Temper […] which was not enclin'd to submit to any Authority in these Subjects".[162] Detached from ancient authorities, Hume's new approach as announced in the letter sets the proper aim of moral philosophy to be the study of human nature, which should be conducted with empirical, as opposed to hypothetical, methods.

As we have seen, renewing moral philosophy by adopting successful models from natural philosophy is a characteristic aspiration of Scottish moral philosophers in the Enlightenment period, and the most significant inspiration came from the success of Newton's natural philosophy: Francis Hutcheson attempted to elaborate a "canon" which contained, as it were, the mathematical principles of moral philosophy and George Turnbull set up an axiomatic framework to analyse moral phenomena. Some commentators have interpreted Adam Smith's achievement in economics and moral philosophy as influenced by Newton,[163] and Hume's study of human nature is also frequently interpreted as Newtonian in some respects.[164]

In this chapter I intend to explore the significance of Hume's references to Copernicus in this context, thereby showing that his understanding of Copernicus's significance is consonant with the experimental methodology he intends to adopt. This methodology is at the heart of Hume's reform of moral philosophy by which he expected to redeem the shortcomings it had inherited throughout the ages.

While exploring Copernicus's significance for Hume I will proceed as follows. First, I briefly explore the place of Copernican ideas in the Scottish Enlightenment and show that Copernicus's meaning in this context was not primarily methodological; instead his reception was focused on the new model of the universe and it was constrained on the field of natural philosophy. It was Hume who placed emphasis on the methodological significance of Copernicanism, and drew his conclusions on the field of moral philosophy. Accordingly, in the next step I turn to exploring the details of Copernicus's methodological significance for Hume focusing on those passages that shed light on the method of Hume's project of a science of man. I will attempt to show that the methodological lessons Hume draws from Copernicus are consonant with the basic tenets of his experimental study of human nature that signify his detachment from the traditional framework in which work in *moral philosophy* had been conceived. Finally I draw attention to the different meanings the phrase *Copernican turn* might have in Hume and Kant. As I will argue, the different ways in which they perceived Copernicus's significance is due, on the one hand, to Hume's fairly idiosyncratic interpretation of Copernicus's heritage as mainly methodological and, on the other hand, to Kant's sticking to the common understanding of Copernicus as providing a

new model of the universe. Despite this difference, however, Hume's *Treatise* can also be seen as establishing a Copernican turn in philosophy similar to Kant's – albeit one following a naturalistic rather than a transcendental path.

Copernicus in Scotland

From the second half of the seventeenth century Copernicus was standard and critically acclaimed material in the curricula of Edinburgh University. The discussion of Copernicus was conducted in the context of abandoning Aristotelian natural philosophy for the sake of Cartesianism just to be rapidly superseded, by the end of the century, by Newtonianism.[165] From the 1660s in the lectures of John Wishart, commentaries on Aristotle's *Physics* had been replaced by a critical discussion of modern developments in natural philosophy, albeit still along the lines of Aristotelian physics. On this basis Wishart challenged the Copernican model of the universe questioning its intelligibility, alleged simplicity, empirical adequacy and its compatibility with the Scripture. Questions of theological compatibility were in the forefront of his natural philosophical interests in general: in his lectures he borrowed some insights from Hobbes and Descartes, but he saw their teaching as threatening either with atheism or with the limitation of God's power – and on this basis he rejected them both.

From the 1680s onwards, Gilbert McMurdo and Alexander Cockburn adopted Cartesian ideas without such reservations, and they spread the mechanical worldview among their students, as was the case with most of their fellow regents in Edinburgh at that time. Until about 1690 Copernicanism prevailed in its Cartesian version in which rotating transparent matter caused the planets to orbit in the same direction, and similar vortices were invoked to explain why objects are falling toward the earth's surface. After the publication of Newton's *Principia*, forces quickly populated the Copernican universe and gravity replaced vortices in the explanation of planetary motions. This transformation of Cartesian Copernicanism into a Newtonian one took place in

Edinburgh fairly rapidly, and by about 1710 the triumph of Newtonianism was eminent at the other Scottish universities as well.

The process of transformation is informatively documented in William Law's astronomy lectures he had given as regent between 1692 and 1704, before he took up the chair in moral philosophy in 1708 that was newly established as a result of the university reform replacing the regent system of Edinburgh University with a professorial structure. Given that he occupied the professorship of moral philosophy until 1728, he might have taught David Hume in that capacity. Law's lectures in the 1690s reflect gradual detachment from, and increasing criticism of, Cartesian vortex theory while approaching Newton's astronomical ideas with an unqualified approval.

By 1704 Law's initial criticism of Newton for failing to provide his findings with satisfactory explanations by the standards of mechanical philosophy disappeared from the lectures.[166] In his lectures of 1701, i.e. towards the end of the process of his Newtonian conversion, Law's discussion of Descartes and Newton was situated in a Copernican framework which was contrasted with Ptolemy's and Tycho Brahe's theories, the latter being represented as a middle course between the two models. Ptolemy's system was criticised mainly for its empirical inadequacy in explaining the movement of Mercury and Venus, and also for lacking the epistemic virtue of simplicity: if compared to Copernicus, Ptolemy is too complicated because his model relies on epicycles and eccentrics. Copernicus was also criticised mainly on account of intelligibility because he had ascribed the earth's movement to the influence of the sun, and also because of the rapidity of the planets' motion.

When Hume attended Edinburgh University in the early 1720s, the culture of science was already dominated by Newtonianism, and due to the work of David Gregory, John Keill and Colin Maclaurin, the influence of Scottish Newtonians extended well beyond the Scottish borders.[167] Generally speaking, Hume was disappointed with the education he received at the university and he had a very low opinion on the knowledge to be acquired there. One exception, to some extent, seems to be the natural philosophy class, which was taught to him by Robert Steuart.[168] In Steuart's class Hume presumably was required to study Keill's introductions to natural philosophy and astronomy, Gregory's introduction to optics and astronomy along with

certain passages from Newton's *Opticks* and *Principia*.[169] Also, he probably made good use of the Physiological Library Steuart had established, which might have provided him with all the relevant literature he needed for an introduction to the problems of contemporary natural philosophy, including those related to various versions of Copernicanism.

An important common feature of these introductory texts, and presumably of the accompanying lectures too, is that they focus on the content and virtues of Copernicus's theory rather than its methodology. The most notable thing about Copernicus's theory is the new model of the universe in comparison with its alternatives and its subsequent interpretations in Descartes's and Newton's natural philosophies. But the novelty of Copernicus's system is not derived from some innovative methodology. In connection with the model of the universe Copernicus offers, his theory is credited with various virtues if compared to that of Ptolemy, but these virtues are not derived from the method Copernicus follows – in fact he is not credited with methodological invention at all.

In these texts it is generally acknowledged that the *empirical adequacy* of Copernicus's model surpasses that of the rival systems of Ptolemy or Brahe, i.e. it conforms to the facts better, and so it can save more phenomena than its rivals. One can also discern here the traces of "a great simplistic myth"[170] that emphasises the *simplicity* of Copernicus's theory if compared to Ptolemy and Brahe. On later scrutiny, however, this myth turned out to be untenable, as has the idea of Copernicus's supreme empirical adequacy,[171] yet in Copernicus's Scottish reception these virtues were unanimously associated with his model of the universe.

Adam Smith, in his essay on the history of astronomy (written in 1751, first published in 1795), finds a further epistemic virtue in Copernicus's model, namely "a superior degree of coherence, which it bestowed upon celestial appearances".[172] For Smith, *coherence* is not primarily a logical property of theories; it is used in the context of other terms like "connection" and "order" whose establishment is the main task of philosophy as "the science of the connecting principles of nature". In his view, philosophy is responsible for "representing the invisible chains which bind together all

these disjointed objects, endeavours to introduce order into this chaos of jarring and discordant appearances".[173]

The success of this enterprise is partly measured by the coherence a theory bestows upon disordered phenomena. Coherence thus understood is a matter of degree and it depends on how successful it is in establishing connections among various phenomena, whether it needs *ad hoc* hypotheses for establishing connections and on how much it leaves unexplained etc. Coherence is thus related to *simplicity*: a system is less coherent if it allows for the introduction of phenomena that complicate a system without good reason, or if it introduces phenomena for the sake of explaining other phenomena but leaves the newly introduced phenomena without explanation or independent motivation. If measured by these standards, Tycho Brahe was found less coherent than Copernicus[174] because he had been less successful in finding out "those hidden chains of events which bind together the seemingly disjointed appearances of nature".[175]

Although in Smith's evaluation the emphasis falls on the epistemic virtues and cognitive content of Copernicus's theory, his emphasis on coherence in this sense and his understanding of the task of philosophy suggest that he has specific methodological ideals in mind that seem to be consonant with Hume's understanding of Copernicus's importance. For Hume, Copernicus is an early representative of efforts made towards "true philosophy" that is centrally committed to *explanatory reductionism*, i.e. a method of subsuming the variety of complex phenomena under a limited number of principles or laws whose combination results in an explanation.[176] Both in the *Treatise* and in his *History of England*, Copernicus is mentioned in the company of those paving the methodological way to "true philosophy": Bacon, Kepler, Galileo, Boyle and Newton pointed out the way to, and made "considerable advances" in "true philosophy".[177] It is Hume's emphasis on the methodological relevance of Copernicus that distinguishes his evaluation from those of his Scottish contemporaries.

Hume's Copernican Turn

As a letter to Henry Home, Lord Kames written at the end of 1737 testifies, Hume thought that his forthcoming *Treatise* would communicate new "philosophical discoveries". In another letter to Home, which he sent shortly after the publication of the *Treatise*, he would consider these discoveries so profound "that were they to take place, they would produce almost a total alteration on philosophy", i.e. a "revolution".[178] At the bottom, Hume's revolution was *methodological*: as the *Treatise*'s subtitle suggests, it consisted in the introduction of the "experimental method of reasoning" into moral philosophy which was contrasted with aprioristic, hypothetical methods.

Adherence to this kind of reasoning is one of the most permanent features of Hume's thought: his disappointment with traditional methods is obvious from the above-quoted "Letter to a Physician", and the alternative method is formulated in and applied throughout the *Treatise*. The supremacy of the experimental method is still emphasised in his 1751 *Enquiry into the Principles of Morals*, which indicates that the fundamentals of Hume's method have not changed much.[179]

The experimental method in moral philosophy that Hume advertises throughout his *oeuvre* is perhaps best explained in part I of chapter VIII of his *Enquiry concerning Human Understanding*. It is here that he gives its detailed description as a kind of analysis and synthesis aiming at the explanatory principles of moral phenomena – a method which is congruous with that of natural philosophy and which can be seen as a refinement of our everyday reasoning underlying navigation in the social world.[180]

Hume's central methodological commitment is reductionist: it consists in finding explanatory principles of human phenomena through comparison and analogies revealed among various particular observations. This process results in more and more general laws or principles of human nature,[181] by the combination of which moral phenomena can be explained. Hume's experimental method of finding causes derives from a study of everyday causal reasoning and consists in its more conscious, reflected and sophisticated application. The empirical study of everyday causal reasoning is thus the source of the normative canon of cause-searching which provides the "logic" equally

characteristic of reasoning in moral and natural philosophy – and of course, to a lesser degree of precision and rigor, of everyday reasoning too.[182]

As Hume sees it, this method is first introduced to natural philosophy as a result of Copernicus's achievement, and in moral philosophy a similar Copernican turn should also take place:

> we find in the course of nature, that tho' the effects be many, the principles, from which they arise, are commonly but few and simple, and that 'tis the sign of an unskilful naturalist to have recourse to a different quality, in order to explain every different operation. How much more must this be true with regard to the human mind, which being so confin'd a subject may justly be thought incapable of containing such a monstrous heap of principles, as wou'd be necessary to excite the passions of pride and humility, were each distinct cause adapted to the passion by a distinct set of principles? Here, therefore, moral philosophy is in the same condition as natural, with regard to astronomy before the time of *Copernicus*. The antients, tho' sensible of that maxim, *that nature does nothing in vain*, contriv'd such intricate systems of the heavens, as seem'd inconsistent with true philosophy, and gave place at last to something more simple and natural. To invent without scruple a new principle to every new phaenomenon, instead of adapting it to the old; to overload our hypotheses with a variety of this kind; are certain proofs, that none of these principles is the just one, and that we only desire, by a number of falsehoods, to cover our ignorance of the truth.[183]

This quote suggests that entering into the post-Copernican phase of moral philosophy brings along a set of methodological commitments and epistemic virtues the moral philosopher is expected to keep an eye on. The first and basic one is a preference for *simplicity*, meaning a commitment to not introducing new explanatory principles for every newly found phenomenon. In Hume's hands this preference entails *explanatory reductionism*: given that it prohibits introducing new principles for new phenomena, it encourages a) subsuming various phenomena under a limited number of principles, and

b) fortitude with respect to established principles by subsuming new phenomena to them. This latter implication also suggests a way of testing theories: in case *ad hoc* hypotheses are needed in our explanations, this indicates reliably that our principles are false.

What Hume seems to imply here is that Ptolemy's followers relied on a heuristics that allowed, at least implicitly, for the introduction of *ad hoc* explanatory principles: they could accommodate any new fact by increasing the number of epicycles and equants. Thus, invoking new *ad hoc* principles of human nature instead of reducing the variety of phenomena in moral philosophy to a limited set of principles would entail similar consequences: incoherence, increased complexity, and loss of explanatory power. In a similar vein, Hume rejects the explanatory strategy that readily introduces independent causes to newly discovered phenomena, and prescribes instead a method whose main methodological rule is explanatory reductionism that also brings along simplicity.

Invoking Copernicus's name in this respect seems to be in perfect order: Osiander's preface to *De Revolutionibus* suggests indeed that simplicity, in contrast with truth, is the main epistemic virtue to be ascribed to the work, and Hume, just like Kant several decades later, was probably unaware of the fact that the preface was not written by Copernicus himself.[184] In the dedicatory letter of *De Revolutionibus*, written to Pope Paul III, Copernicus himself also supports Hume's explanatory reductionism indirectly. Here, he complains about the contradictions that arise in various theories due to the introduction of homocentrics, eccentrics and epicycles, and emphasises the importance of explanatory deduction and, in general, of following stable methodological principles.

In this context it may be surprising to see Hume mentioning approvingly the maxim "that nature does nothing in vain" – an Aristotelian-Scholastic principle that does not seem to fit Hume's experimental method. First, in the Scholastic tradition principles like this were taken to constitute a self-evident universally valid metaphysical and logical foundation of natural philosophy.[185] Given Hume's epistemological commitments, such standing cannot be granted to the maxim "that nature does nothing in vain" or any other rule of reasoning; yet, such rules can be approved as "constant and universal principles" of reasoning, and human nature in general, that are known

empirically, i.e. from history and the observation of common life.[186] So the maxim can be seen as distilled from observation and as such it expresses the methodological commitment that the principles of nature and human nature are not complex beyond necessity, not superfluous, and therefore nature follows the simplest path. If viewed from this angle, this maxim establishes explanatory reductionism, i.e. a parsimonious search for a set of principles with which the variety of phenomena can be explained.[187]

Secondly, in the Aristotelian tradition the maxim "that nature does nothing in vain" is clearly a teleological principle,[188] which has a central role to play in finding final causes, and as such it has no place in Hume's non-teleological framework. Hume explicitly denies that there could be any other causes than efficient ones,[189] and thereby he leaves no rational place for a commitment that there are ends in nature toward which efficient causes operate. This denial is also extended to the study of human nature. When responding to Francis Hutcheson's worries, Hume declares:

> I cannot agree to your Sense of *Natural*. 'Tis founded on final Causes; which is a Consideration, that appears to me pretty uncertain & unphilosophical. For pray, what is the End of Man? Is he created for Happiness or for Virtue? For this Life or for the Next? For himself or for his Maker? Your Definition of *Natural* depends upon solving these Questions, which are endless, & quite wide of my Purpose.[190]

As opposed to understanding 'natural' in terms of final causes, in Hume's analysis 'natural' is contrasted with terms like 'miraculous', 'unusual' and 'artificial', and drawing on the contrast with the latter, he characterises natural traits and processes as those belonging to a normally functioning human being in itself, i.e. someone exempt from social influences or pathologies.[191]

In studying the normal functioning of human beings, the maxim that "nature does nothing in vain" expresses a kind of teleological attention of the "anatomist of human nature",[192] but it is not of the Aristotelian but of a purely *descriptive* kind. In Hume's case it expresses the anatomist's commitment to functional analysis:[193] Hume

abundantly talks about our faculty of reasoning and the faculties of memory and imagination etc., and their various principles – not as independently identified causal sources or postulates of some preconceived hypothesis in the framework of which experience is to be interpreted, but as conclusions of comparative functional analyses: the ingredients of human nature whose identity depends on whether the analysis of relevant observations is correct.[194]

For Hume, inquiry does not begin with hypothetical definitions of faculties, and explanations do not proceed from those definitions. Instead, inquiry begins with observations and reveals their systematic connections, which will result in the principles that describe and identify the characteristic activities of faculties. When Hume claims that any ability can be ascribed only if it is exhibited,[195] he clearly suggests that he does not mean that faculties cannot be known at all, only that they cannot be known independently of, and prior to, their functioning.

This is the context in which Copernicus and the maxim "nature does nothing in vain" reappear in Philo's monologue in the *Dialogues concerning Natural Religion*:

> *That nature does nothing in vain*, is a maxim established in all the schools, merely from the contemplation of the works of nature, without any religious purpose; and, from a firm conviction of its truth, an anatomist, who had observed a new organ or canal, would never be satisfied, till he had also discovered its use and intention. One great foundation of the Copernican system is the maxim, *that nature acts by the simplest methods, and chooses the most proper means to any end* […].[196]

This passage contains concisely Hume's commitment to distilling rules of reasoning from observation and to functional analysis, which is portrayed here as a natural and appropriate stance of an anatomist. This is further reinforced in the following paragraph in which Philo praises Galen's aspirations for a functional understanding of the muscles.

While pursuing this understanding of mental faculties, Hume follows a method whose origins, as we have seen above, he traces back to Copernicus, and which he

considers to be equally uniform in both natural and moral philosophy, i.e. "to reduce the principles, productive of natural phænomena, to a greater simplicity, and to resolve the many particular effects into a few general causes, by means of reasonings from analogy, experience, and observation."[197] Finding analogies between different instances gives the chance of explaining causes and reducing them to "more general principles".[198]

In the *Dialogues*, and especially in the sections criticising the design argument, Hume seems to be more critical of analogical reasoning than in his other passages of similar methodological relevance,[199] nevertheless Philo pronounces "analogies and resemblances" reliable enough to serve as the "sole proofs of the Copernican system".[200] Given that in Hume's epistemology the category of *proof* provides the highest level of epistemic certainty available for any piece of empirical knowledge, analogical reasoning is a highly esteemed way of reaching theoretical conclusions in exploring the principles of nature and human nature.[201] It is history, natural and civil as well, that provides the pool of observations from which philosophers, natural and moral as well, relying on analogies can establish explanatory principles.

This gives the broad outlines of a methodological ideal that Hume suggests be observed by natural and moral philosophers, and central aspects of this methodological ideal are connected to Copernicus: analogical reasoning, functional understanding, and explanatory reductionism are the main Copernican aspects of Hume's science of man, and on Hume's evaluation, they distinguish his enterprise from most of his predecessors and contemporaries.

This thoroughly naturalistic stance distinguishes Hume's project from many of his Scottish contemporaries. Other contemporary Scottish moral philosophers, like Hutcheson, Turnbull and David Fordyce, share a religious *cum* teleological perspective that promises to deliver knowledge of God and the purpose of human beings, and aims at drawing direct normative consequences concerning our duty.[202] Stephen Gaukroger places Copernicus at the beginning of a long struggle for not letting non-scientific disciplines intervene into scientific matters, for an autonomous scientific enterprise whose "values and norms are open to no refutation from outside".[203] Hume certainly contributes to this Copernican struggle with his strict adherence to his "experimental method" in moral philosophy, and rejection of religious and teleological considerations

because, as he writes to Hutcheson in his above quoted letter, these are "unphilosophical", meaning that they are outside of the scope of Hume's purely descriptive and explanatory aspirations.

Hume and Kant

Several commentators suggest that Hume announces a Copernican turn in moral philosophy that is similar in crucial respects to Kant's Copernican turn,[204] which he summarises in the second edition of the *Critique of Pure Reason* as follows:

> Up to now it has been assumed that all our cognition must conform to the objects; but all attempts to find out something about them *a priori* through concepts that would extend our cognition have, on this presupposition, come to nothing. Hence let us once try whether we do not get farther with the problems of metaphysics by assuming that the objects must conform to our cognition, which would agree better with the requested possibility of an *a priori* cognition of them, which is to establish something about objects before they are given to us. This would be just like the first thoughts of Copernicus, who, when he did not make good progress in the explanation of the celestial motions if he assumed that the entire celestial host revolves around the observer, tried to see if he might not have greater success if he made the observer revolve and left the stars at rest.[205]

For Kant the relevance of Copernicus's project consists in supposing the observed motions of the planets not to be real motions but appearances generated by the observer's motion. Analogously, Kant suggests metaphysics should take a similar turn by supposing that the activity or constitution of the observer is responsible for a significant share of what a human being experiences. This is typically the case with those

features that we can assign to objects *a priori*; i.e. those features that belong to objects because we apprehend them, but we do not apprehend them that way because the objects in themselves (i.e. independently of human cognitive capacities) are that way. Exploring *a priori* conditions on possible objects of human experience is the main task of Kant's transcendental metaphysics, which thus aims at exploring the limits and prospects of human cognition.

Hume's project is sometimes interpreted from this Kantian perspective, and there is indeed a certain fundamental similarity in the two projects, namely their undertaking to explore the foundations and thereby the proper limits of human knowledge.[206] As Hume puts it in his introduction to the *Treatise*:

> 'Tis evident, that all the sciences have a relation, greater or less, to human nature; and that however wide any of them may seem to run from it, they still return back by one passage or another. Even *Mathematics*, *Natural Philosophy*, and *Natural Religion*, are in some measure dependent on the science of MAN; since they lie under the cognizance of men, and are judg'd of by their powers and faculties. […] There is no question of importance, whose decision is not compriz'd in the science of man; and there is none, which can be decided with any certainty, before we become acquainted with that science. In pretending therefore to explain the principles of human nature, we in effect propose a compleat system of the sciences, built on a foundation almost entirely new, and the only one upon which they can stand with any security.[207]

Something similar is clearly true about Kant's aspirations as well: exploring the features of human cognition in order to reveal the limits of possible human knowledge. In this respect both Hume and Kant inherit the long-standing philosophical aspiration to explore human nature, but they pursue this project with commitments to different philosophical methods and they urge philosophy to take a turn in different directions. Copernicus thus becomes a symbol in these contexts in two very different guises.

As Hans Blumenberg aptly points out, Copernicus's significance for Kant consists in the *model* of the universe he created. It is the model itself that concerns Kant, and not the criteria of evaluating and creating models, i.e. Copernicus's significance for Kant is not methodological: it is Copernicus's vision that matters to him, and quite consistently with this, Kant does not list Copernicus among the heroes responsible for renewing science.[208] Copernicus's vision of the universe serves as a motivation to Kant's model of the cognitive universe: instead of starting from appearances given in experience, Kant proposes to explore first the *a priori* contribution that the human cognitive subjects make to the experience available to them. A natural consequence of this Copernican perspective is Kant's *transcendental method*, which is used to explore the *normative* constraints that the mind must conform to if it is to represent things and make judgments as it in fact does.

Kant's method is discontinuous with that of experimental natural philosophy. It is exploited to explore the *a priori* constraints and possibilities of cognition, including any empirical cognition, and this investigation yields knowledge of our cognitive capacities, and not the world of external objects in itself, because "we can cognize of things *a priori* only what we ourselves have put into them".[209] Applying the transcendental method can thus provide foundational knowledge, i.e. knowledge about the conditions of possibility of any human knowledge, and it means to "treat the laws that make possible the concept of a nature in general, even without relation to any determinate object of experience, and thus undetermined with respect to the nature of this or that thing in the sensible world". Thus the *a priori* method with which this foundational knowledge is pursued aims at revealing what the empirical study of nature presupposes, and therefore it "must always contain solely principles that are not empirical".[210] The transcendental method therefore is not a method to be generalised with respect to other fields of inquiry. It belongs exclusively to the *a priori* exploration of the conditions to which any inquiry must necessarily be subordinated.

For Hume, in contrast, there is no methodological divide between the study of nature and the conditions of human cognition. This is due to Hume's commitment to the empirical study of both nature and human nature: natural and moral philosophy (the latter being preoccupied with the study of phenomena belonging to moral beings)

are methodologically continuous fields of study. This continuity is based on the fact that the phenomena they study are part of the same causal order. In explanations these phenomena are referred to as equal members of the same causal chain, as Hume's famous example of a prisoner shows: his hopes for freedom are equally frustrated by the physical properties of the bars and the determination of the guard –[211] natural and moral properties concur in making the punishment inevitable.

Our reasoning about moral and natural phenomena is thus continuous. Inquiry in both fields of study is based on the idea of a necessary connection that arises from the impression we acquire due to experiencing constant conjunctions between phenomena. Our natural causal reasoning is based on this necessity, and this is the foundation of all theoretical causal cognition concerning the moral and the natural world.[212] Among the phenomena studied by moral philosophy from human cognition to morality and sociability one can find constant conjunctions and there are also exceptions to the observed regularities – just like in natural philosophy.

Therefore, there is no special method reserved for studying the conditions of human cognition. If our focus is on any aspect of human nature, human history provides us with the variation of circumstances in which the characteristics of human cognition can be identified and studied so as to establish the principles of its causal contribution in particular situations. The principles of human nature that Hume endeavours to explore belong to the hidden parts of nature that can be explored by a method of qualitative analysis and synthesis.[213] Human nature is a compound entity whose ingredients can be revealed only by the experimental method of *reasoning*.

The method is thus simple: it consists in collecting relevant phenomena, finding analogies between them, and ascribing those analogies to similar causes, thereby reducing a variety of phenomena to regular principles that inform them. But our knowledge cannot transcend what we can infer on an empirical and analogical basis from the effects themselves – and this diagnosis applies to our knowledge of the conditions of human cognition too. On Hume's account there is no way of acquiring the *a priori* knowledge that Kant after his Copernican turn aims to deliver. On the contrary: the core of Hume's Copernican turn consists in the commitment to the exploration of empirically accessible principles of human cognition – among other principles of

human nature.

Although their projects are similar in aspirations, the methods Hume and Kant follow are different, and this explains the difference between the uses they make of Copernicus. For Hume he becomes a symbol of the *methodological* renewal of natural philosophy, and in that role he provides an inspiration for reforming moral philosophy so as to raise its cognitive value to the level of natural philosophy. For Kant, in contrast, Copernicus's relevance is not at all methodological; rather, he becomes the symbol of a new *perspective*, whose model of the universe is transformed into an inspiring metaphor for a new model of the cognitive universe. Although Copernicus did not aspire to be a revolutionary in the modern sense of the term – instead he wanted to restore something that had been lost –,[214] his example provided inspirations for Hume and Kant for exploring human cognitive capacities in radically novel ways, albeit in rather different directions.

IV. Newton's Method and Hume's Science of Man

As we have seen in Chapter I at the end of his *Opticks*, Newton expresses his hope that with the refinement of natural philosophy, moral philosophy will also be elevated to a higher level. Newtonian natural philosophy is not an exclusively explanatory enterprise, but entails a natural theology that reveals normative constraints imposed on human beings by their creator. From this perspective, studying nature is continuous enterprise with studying scripture. According to eighteenth-century divisions of knowledge,[215] moral philosophy also existed as a semi-autonomous discipline, and not only as an extension of natural philosophy, although it typically remained within the same theological frame of reference.[216] The proper domain of moral philosophy was the study of human beings not as natural or physical entities, but as moral agents.

From the perspective of the study of human beings as moral agents natural philosophical explanations of sub-personal processes are of no use: in terms of sub-personal processes, human beings cannot be represented as moral agents, only as natural entities. Therefore, understanding moral beings requires explanations at the personal level, and this distinctive focus granted some autonomy for moral philosophy: it could be considered an independent body of knowledge regarding phenomena that could be variously studied.[217]

The aspiration of becoming the "Newton of the moral sciences" has been frequently ascribed to Hume, albeit he never claimed a title like this for himself. It remains a widely disputed question whether, and if yes to what extent, his science of man is modelled on Newton's natural philosophy. Some interpreters argue that Hume's philosophy is part of the revival of natural history in Enlightenment Scotland and as such it is Baconian in character.[218] Others have argued that Hume's project is mainly inspired by Robert Boyle's experimental philosophy,[219] or alternatively that starting from a Boylean standpoint in the *Treatise* he moved toward a more Newtonian rhetoric in the first *Enquiry*.[220] Perhaps the most widespread interpretation holds that in various ways the *Treatise* has close connections to Newton's works, primarily to the *Principia*.[221] And

recently it has also been suggested that Hume, in a similar vein to Buffon, adopts a critical stance towards the mechanical and mathematical foundations of experimental natural philosophy, thereby preparing the grounds for "Enlightenment vitalism".[222] In this chapter I explore the validity of the label "Newtonian" in Hume's case: in what sense and to which extent can he be labelled as such?

Why not the Principia*?*

The *Principia* embodies what I.B. Cohen termed the "Newtonian style", whose constitutive feature is the mathematization of nature, i.e. "dealing mathematically with the realities of the external world".[223] Books 1 and 2 of the *Principia* laid the foundations of this procedure of progressively more complex idealizations built around the central concept of 'force'.

Some interpreters, e.g. Richard Westfall and Howard Stein,[224] have suggested that by introducing force, and most importantly: gravity, Newton indeed augmented the traditional ontology of mechanical philosophy that had been until then restricted to the qualities of size, shape, motion and solidity. But as e.g. Andrew Janiak sees it, however, Newton did not need force to be part of his ontology in this sense. It is enough if 'force' denotes a quantity measurable by measuring other physical quantities, among which mass plays a crucial role, but Newton never commits himself concerning the ontological category to which it belongs.[225] On the first reading, Newton is a realist about forces in very much the same sense as he and other mechanists are realists about primary qualities. On the second reading, Newton is also a realist about forces, but beyond his commitment to some measureable quantity, he refrains from committing himself as to whether it is a quality, a mode or even a substance.

Understood either way, Hume begs to disagree. For him 'force' belongs to the same family of concepts as 'power', 'energy' and 'necessary connection',[226] i.e. it is related to questions surrounding the relation of 'cause' and 'effect'. Given that we have no direct experience, no impression of force or any causal connection, the problem is to

find the impression from which these ideas can arise. Hume's solution, in a nutshell, is that our natural inclination to see certain relations as that of cause and effect is based on nothing else but habit: we experience constant conjunctions, get used to them, and as a result, our mind projects on to causal relations, forces, energy on to the world. This process gives rise to an impression of "a determination of the mind to pass from one object to its usual attendant".[227] This impression is the source of our idea of necessity, and this is at the heart of causal reasoning.

As a *philosophical relation*, causation implies only "contiguity, succession and constant conjunction", but the specific ability to draw causal inferences hinges on the *natural relation* of cause and effect grounded in a determination of the mind –[228] and not on forces or causal connections being perceived in the world or inferred by reason. Thus, if Newton understands gravity as one among the qualities of matter, then Hume's critique poses a serious challenge: we cannot have the idea of a force as a primary quality.

Janiak's reading suggests that it is enough for Newton's theory if 'force' makes mathematical sense by being defined in terms of other quantifiable properties. For Hume's epistemology, however, making mathematical sense is not enough for natural philosophy to have empirical content. He draws a sharp distinction between two kinds of reasoning.[229] Demonstrative reasoning is *a priori*, it is concerned with relations of ideas, and mathematics is one of its exemplary fields. Probable reasoning is based on the relation of cause and effect, it is *a posteriori*, and it provides the foundations of theorizing concerning all matters of fact. This means that *a priori* mathematical constructions cannot be taken as representations of reality because "the only objects of the abstract science or of demonstration are quantity and number, and that all attempts to extend this more perfect species of knowledge beyond these bounds are mere sophistry and illusion".[230]

This does not entail, however, that mathematics is altogether useless in natural inquiry. As Hume says:

> Mathematics, indeed, are useful in all mechanical operations, and arithmetic in almost every art and profession: But 'tis not of themselves they have any influence. Mechanics are the art of regulating the motions of bodies to some design'd end or purpose; and the reason why we employ arithmetic in fixing the proportions of numbers, is only that we may discover the proportions of their influence and operation.[231]

So it seems, quantification is all right if it is about measuring proportions, or the magnitude of causes and effects. We can rely on mathematics as a useful tool in natural philosophy, and especially in its application, but we cannot proceed on *a priori* mathematical principles in our inquiries concerning matters of fact. Natural philosophy, being concerned with matters of fact, cannot be based on mathematical axioms, and so we cannot have it as *essentially* mathematical. Given the limits of human cognitive capacities, the book of nature cannot be meaningfully deciphered in the language of mathematics.

Although for Newton algebra was a useful heuristic device in finding the propositions of the *Principia*, their demonstration belonged to the realm of geometry.[232] Geometry, according to Hume's position in the *Treatise*, cannot play the role that Newton makes it play in his natural philosophy. For Hume, geometry is adequate for practical purposes as "the *art*, by which we fix the proportions of figures",[233] but it is incapable of demonstrative certainty that Newton wants to achieve.[234] For Hume, as Henry Allison aptly puts it, geometry "is concerned with the eye rather than the mind",[235] i.e. it is about actual shapes of things and not idealized objects, and as such it depends on the senses. Therefore geometry cannot provide us with the demonstrative certainty and precision that Newton claims to have.

Albeit there are no signs of mathematical tendencies in Hume's moral philosophy, there is a passage whose inspiration commentators frequently derive from Newton's account of gravity.[236] In this passage Hume characterizes the principles of association as uniting principles of the mental world, which in this respect may seem similar to the role Hutcheson ascribes to benevolence in the social world:

> These are therefore the principles of union or cohesion among our simple ideas, and in the imagination supply the place of that inseparable connexion, by which they are united in our memory. Here is a kind of attraction, which in the mental world will be found to have as extraordinary effects as in the natural, and to show itself in as many and as various forms. Its effects are every where conspicuous; but as to its causes, they are mostly unknown, and must be resolv'd into *original* qualities of human nature, which I pretend not to explain.[237]

Interpreting this passage as if Hume was invoking Newton's gravity as analogous with his association I find tendentious and ungrounded. First, Hume nowhere in the *Treatise* mentions gravity in connection with his theory of association. There is a passage where he talks about gravity in connection with the imagination, but there gravity is an obstacle to imagination, and its consequence is a reluctance of the imagination to pass on from one idea to another. As such the effect of gravity in the mental world is contrary to that of association as a "gentle force" that facilitates union among simple ideas.[238]

Secondly, the passage itself does not support the alleged connection between "association" and "gravity". Gravity does not have "extraordinary effects" in "various forms": it has a uniform effect on all bodies throughout the universe, and the passage, lacks any Newtonian allusion to, for example, the inverse square law – quite unlike in Hutcheson's case as we have seen in Chapter 2 above. Hume's principles of association could be, at most, analogous to Newton's short-range attractions, but those lead us away from the domain of the *Principia*'s possible influence to that of the *Opticks*.

Thirdly, the principles of association seem to behave more like principles of elective attraction that work not uniformly but discriminately. Unlike universal gravity, the principles of association do not hold universally between any ideas, only between some, and there is, of course, an indefinite number of ideas that do not stand in associative relations at all. Furthermore, the possible associative links between any two ideas largely depend on their content: the principle of cause and effect, for example, can connect two ideas that may not be connected by resemblance.

Apart from these divergences, there are some respects, in which Hume's method can be aptly compared to that of Newton's *Principia*. Among these one can mention some of Hume's rules of reasoning, e.g. same effect – same cause and *vice versa*, which figure among those Newton puts forward in the second and third editions of the *Principia*.[239] This seems to be a rule of inference they both follow while exploring the causes underlying phenomena.

Furthermore, they both acknowledge that their philosophies have limits in accounting for the causes of phenomena, and admit that they cannot provide the ultimate causes of the laws or principles.[240] They also both refuse to enter into empirically ungrounded speculations, i.e., ones that are not gained by the analysis of phenomena. And most notably, they follow a very similar strategy in treating central metaphysical problems.

As Howard Stein shows, in Newton's hand traditional metaphysical questions, like, e.g., those concerning space or God, are turned into empirical ones, and they are thus transferred from the field of metaphysics to natural philosophy.[241] His strategy is to interpret observations as evidence grounding certain probable inferences concerning these questions. And Hume treats concepts of central metaphysical importance (like e.g. causation, liberty and necessity, etc.) in a like manner: the genealogy and content of these concepts are not explored as issues pertaining to *a priori* metaphysics, but as questions deserving empirical study.[242] Besides, as we have seen in the previous chapter, for Hume "true philosophy" is centrally committed to *explanatory reductionism*, i.e. a method of subsuming the variety of complex phenomena under a limited number of principles or laws whose combination results in an explanation.[243]

These are, however, fairly superficial methodological similarities that would not give support to the idea of a substantially Newtonian method in Hume. Actually, if one takes the *Principia*'s "Newtonian style" as the essence of Newton's method, then one should also conclude that Hume's method is not Newtonian. But these very general methodological features also inform Newton's other *chef-d'oeuvre*, the *Opticks*.

In the aftermath of the Opticks

In the *Opticks* Newton discussed phenomena that turned out not to be susceptible of mathematical treatment in his hands. Although he did make attempts to develop a demonstrative physical optics in the "Newtonian style", but eventually these proved to be futile.[244] This is reflected in a methodological passage of Query 31 in which he defines analysis as proceeding *either* "from motions to the forces producing them" *or* "compounds to ingredients".

In the Preface of the first edition to the *Principia* one of the two main tasks of natural philosophy seemed to him to be the analysis of motions into forces (the other being the "demonstration" of phenomena from forces so discovered), although he did not speak in terms of "analysis and synthesis" there.[245] The fact that in Query 31 Newton refers to two different ways of analysis seems to reflect the failure to extend mathematical analysis to all optical phenomena. This anomaly is perhaps the most obvious in the case of colours, where he had to give up his initial hopes for a mathematical exposition that he had achieved for fits and refrangibility.[246] Eventually he had to allow for an experimental decomposition of white light into its component colours, but stop short of giving it full mathematical treatment in terms of motions and forces acting on light corpuscles.[247]

What is most important for us in the present context is that in Query 31 Newton implicitly allows for *qualitative* analysis, i.e. analyzing "compounds to ingredients", as a route to explanatory principles,[248] and he was even to contemplate the possibility of accounting for optical phenomena as chemical phenomena.[249] This qualitatively oriented way of analyzing phenomena proved to be fruitful in other fields of study that resisted mathematization, for example in the study of chemistry and organized living matter, and allowed to extend the label "Newtonian" to these approaches and thus to increase the confusion about the meaning of this label.[250]

Most of eighteenth-century Scottish chemistry developed under the influence of this anomaly of Newton's original programme, i.e. the failure of the project of analyzing optical phenomena in a mathematical language. One of the consequences was the

replacement of the demonstrative ideal in several parts of natural philosophy by much more modest knowledge claims. For example, Hume's friend and physician, Joseph Black declared about chemistry toward the end of the century that

> [w]e are very far from the knowledge of first principles. We should avoid every thing that has the pretensions of a full system. The whole of chemical science should, as yet, be analytical, like Newton's Optics; and we should obtain the connecting principle, in the form of a general law, at the very end of our induction, as the reward of our labour.[251]

And William Cullen, Black's teacher and another friend of Hume's, also emphasized that explanatory principles in chemistry are to be sought from the phenomenal level, and not from some allegedly fundamental mechanical hypothesis. Scottish physicians, like George Cheyne and James Keill, who at the end of the seventeenth-century had worked within a mechanical framework, also started to explore physiological phenomena in terms of "varied attractive forces of different substances", i.e. in a qualitatively oriented chemical language inspired by the *Opticks*.[252]

Hume adopted an outlook similar to this *Opticks*-inspired Scottish Newtonianism both for natural and for moral philosophy. In our natural inquiries, it is in vain to attempt

> to penetrate into the nature of bodies, or explain the secret causes of their operations … I am afraid, that such an enterprize is beyond the reach of human understanding, and that we can never pretend to know body otherwise than by those external properties, which discover themselves to the senses.[253]

This is easy to be read as a challenge to mechanical philosophy: regularities can be found and principles should be established without the metaphysical commitments of mechanical philosophy. Once acknowledged, this insight paves the way for

understanding qualitative changes in their own terms – and not in terms of allegedly fundamental mechanical properties and interactions. This outlook is also reflected in the Introduction of the *Treatise* when Hume characterizes his experimental stance:

> the essence of the mind being equally unknown to us with that of external bodies, it must be equally impossible to form any notion of its powers and qualities otherwise than from careful and exact experiments, and the observation of those particular effects, which result from its different circumstances and situations. And tho' we must endeavour to render all our principles as universal as possible, by tracing up our experiments to the utmost, and explaining all effects from the simplest and fewest causes, 'tis still certain we cannot go beyond experience; and any hypothesis, that pretends to discover the ultimate original qualities of human nature, ought at first to be rejected as presumptuous and chimerical.[254]

This strict adherence to what is given in phenomenal experience, and the rejection of going beyond it, undermines the plausibility of those readings that propose to understand Hume's project in the aftermath of Boyle.[255] Boyle's attempts in chemistry were dominated by forcing phenomena into a mechanical Procrustean bed, and thereby not so much to explore and explain chemical reactions than "to demonstrate the validity of the mechanical philosophy of nature".[256] Hume would not approve a chimerical approach like this in his moral philosophy.

As Colin Maclaurin puts it in his account of Newton's discoveries: while the *Principia* inquires into forces acting between bodies in great distance, the *Opticks* explores the "hidden parts of nature", which are not so easily "subjected to *analysis*" because of the subtlety and minuteness of the agents.[257] The principles of human nature that Hume endeavours to explore also belong to the hidden parts of nature that can be explored by a method of qualitative analysis and synthesis similar to the one advertised in Query 31.

In the first two books of *Opticks* Newton himself also uses the method of analysis

of compounds into ingredients "to discover and prove the original differences of rays of light",[258] that is to discover qualitative differences that persist due to the lack of their analysis in the "Newtonian style". Most notable among them are colours that, as he pointed out in his early letter to the Royal Society, "are not Qualifications of Light, derived from Refractions, or Reflections of natural Bodies (as 'tis generally believed,) but Original and connate properties, which in divers Rays are divers".[259] In pursuing this method, analogy also has a central role: Newton proceeds by the observation and comparison of different rays of light with respect to various properties like "refrangibility, reflexibility, and colour, and their alternate *fits of easy reflexion* and *easy transmission*".[260]

Comparing rays of light reveals their determinable properties which, once determined, can be used in constructing explanations. This amounts to revealing the relevant properties and the ways in which they are instantiated in particular cases, and it is also the central tenet of Hume's method, and this is what distinguishes his enterprise from the hypothetical-deductive study of moral philosophy:[261] in some way salient human phenomena are collected from history and observation, then compared; if analogies and similarities are found, they are ascribed to some principle of human nature that are also compared, grouped and resolved into more general ones. This process results in determinable properties of human nature like the faculties of reason, sympathy, moral sense etc.; determining how these properties are actually instantiated in different social, historical, individual, etc. circumstances provides the explanatory raw material for singular phenomena.

Thus we reach directly unobservable principles of human nature that are the proper aim of inquiry in the science of man. These principles can be used, at the stage of synthesis, to explain why our impressions and ideas follow one another in the order they do. Hume's principles of human nature are, then, qualitatively different: they are identified by their distinctive contribution to the chain of ideas and impressions.[262]

Methodologically speaking, William Cullen's chemistry can be seen as a natural philosophical counterpart to Hume's moral philosophy.[263] Cullen's chemistry is aptly interpreted as belonging to the research tradition the *Opticks* initiated: it pursued a project of discovering the internal micro-force relations of matter to be placed alongside

with the macro-force of Newtonian gravity.[264] Most of the explanatory work in Cullen's chemical enterprise is done by *elective attractions* – described and classified on the phenomenal level because their underlying causes are proclaimed to be unknown.[265] In remarkable unison with Query 31, he defined chemistry as a discipline whose proper field is the study of qualitative differences with the method of *analysis of substances into constituent parts*, and he contrasted this method with the analysis of matter, respectable from the mechanical perspective, into homogeneous *integrant parts* distinguished only by their shape, size and quantity.

Chemistry studies those properties of bodies that depend on their mixture by means of analysis of compounds into "constituent parts". This method is focused on the "particular properties" of the different constituents of which a given mixture is composed, and it aims at studying those components with respect to their "habits of mixture" and to the "properties of mixts from different ingredients".[266] Following this method was perceived not only as resulting in truth, but also in knowledge useful for practical purposes from agriculture to medicine.[267]

Placing Hume in this context secures his position in the tradition that Peter Hanns Reill called "Enlightenment vitalism". Inspired partly by a "creative reinterpretation"[268] of Newton's concept of an aether and partly by the inability of mechanical theories to deliver satisfactory explanations in several fields of inquiry, enlightenment vitalists replaced the mechanistic image of nature as inhibited by homogeneous inert matter and external forces acting on it by an alternative image which emphasized qualitative differences, elective attractions and organic interaction. This approach emphasized the importance of analogical analysis in charting the connections among various parts of nature with their own characteristic dynamics.[269]

If viewed from this angle, human nature is a compound entity whose proper study consists in exploring its anatomy through its normal functioning. The main inspiration of this style of inquiry came from the Queries of the *Opticks*: e.g. the ether hypothesis put forward in these passages provided one of the main inspirations for the idea of a natural world populated by active principles. Although initially "aether" was interpreted as a mechanistic concept, and it was ascribed the role of transmitting forces between bodies, its re-interpretation first as a materialistic concept and then as a

vitalistic active principle was widespread and increasingly popular among eighteenth-century naturalists – so much so that even Hume himself seems to favour the latter interpretation.[270]

It is likely that Hume did get to know the relevant editions of *Opticks* during his years spent at the University of Edinburgh, and may well have been exposed to lectures on it as well, but it is uncertain how reliable his working knowledge of it was.[271] Although in general he was dissatisfied with university education, at least he found some satisfaction in his natural philosophy class.[272] A probably more important introduction to the outlook that has spread due to the influence of the *Opticks* came from Hume's medical readings in relation to his mental breakdown at the age of 18.[273]

The most important document of this struggle is his 1734 "Letter to a Physician",[274] in which the medical description of his condition, as M.A. Stewart puts it, "seems to be consciously modelled on George Cheyne's *The English Malady*",[275] published in 1733. Compared to Cheyne's other works, most notably to *Philosophical Principles of Religion Natural and Revealed* which may have served as an inspiration to Hume's *Dialogues*,[276] the *The English Malady* is a remarkably secularized work.[277] But the *Philosophical Principles* might also have an important contribution to Hume's plan of writing the *Treatise* that was probably ready by the time he left for France in 1734.[278]

Another probable medical reading that might have influenced Hume in connection with his medical condition was Bernard Mandeville's *A Treatise of the Hypochondriack and Hysterick Passions*, first published in 1711, and a second revised edition followed in 1730.[279] John P. Wright has suggested, somewhat contrary to Stewart's reading, that the "Letter to a Physician seems to be based" on this work.[280] As Wright points out, there is a significant difference between the two editions. In the first, Mandeville denies the possibility of thinking matter, but in the second edition he claims material implementation necessary for thinking.

Beside the apparent turn away from iatromechanism, Mandeville was also critical about the usefulness of mathematics in medicine, and instead of elaborating detailed theories of diseases he recommended careful observation as the key to successful treatment of diseases.[281] In various other passages, too, Mandeville sounds very much like Hume. He was highly critical of vain theoretical, for him quasi-religious

debates between Aristotelians and Cartesians, and recommended cognitive humility in medical matters, because e.g. "Our shallow Understandings will never penetrate into the Structure of Parts of that amazing as well as mysterious Composition, the Mass of Blood" therefore we should not "assert any more of it than what Observation will allows us".[282] Unlike Cheyne, who considered animal spirits on par with "the *Substantial Forms* of *Aristotle*",[283] Mandeville stuck to them in his explanation of e.g. depression, and Hume also relied on them in some of his rare physiological excursions.[284] And the idea of an anatomy of human nature may also have Mandevillean roots, but it also seems to have gained more widespread currency.[285]

Presumably, it was not only these works that Hume read in this field, but these works alone could have provided an introduction to an emerging vitalistic perspective on nature.[286] As reflected in his physiological references, he was "impeccably well informed" about common physiological theory,[287] and in these passages he seems to adopt a vitalistic stance: He turns to a physiological explanation of mistakes in reasoning couched in terms of animal spirits, and argues from the analogies between human and animal anatomy and physiology to the conclusion that the mental capacities of animals must be similar to those of humans, and they are different mostly in degree and not in kind.[288]

Beside these explicit references much of the terminology Hume chooses to represent mental phenomena reflect the influence of physiological theory. He talks about contradictions that "heated [his] brain", and about the force and vivacity of ideas that "diffuses itself … and is convey'd, as by so many pipes or canals".[289] This physiological terminology is frequently combined with chemical imagery of association as elective attraction among ideas or of the mingling of contrary passions as "alkali" and "acid" or "oil" and "vinegar".[290] These phrases signal the transmission of a vitalistic and qualitatively-tuned language of physiological phenomena to the moral domain.

Toward an anatomy of human nature

The idea of an anatomy of human nature, if not the term itself, is already present in the "Letter to a Physician" in which Hume discusses the complications involved in bringing "the Idea he comprehended in gross, nearer to him, so as to contemplate its minutest Parts, & keep it steddily in his Eye, so as to copy these Parts in Order".[291] In the *Treatise* the metaphor returns to depict his enterprise as aspiring to "an accurate anatomy of human nature",[292] it works in the same way in his correspondence with Hutcheson, and Hume relies on the same image in the first *Enquiry*.[293] Hume uses this metaphor to emphasize that his project is descriptive and explanatory of moral phenomena in contrast with the normative and evaluative content of everyday morality and the moralists' pronouncements and prescriptions.

Hume does not reserve the metaphor of anatomy exclusively for his own enterprise: it emerges repeatedly as a metaphor for inquiries into the underlying structure of various, typically natural phenomena. In these contexts "anatomy" means two things: it concerns either the analysis of compounds into ingredients or charting the underlying principles from which phenomena arise. For example, he understood Newton's "explication of the wonderful phenomenon of the rainbow" in the *Opticks* as "anatomical" in the first, qualitative sense. In the *Dialogues* he has Cleanthes say that Newton there "gives a minute anatomy of the rays of light", and that thereby "[l]ight is in reality anatomized".[294]

In *The Natural History of Religion* he argues that people find "the first obscure traces of divinity" due to their ignorance of causes that can be cured if men could "anatomize nature". As a result

> they would find, that these causes are nothing but the particular fabric and structure of the minute parts of their own bodies and of external objects; and that, by a regular and constant machinery, all the events are produced, about which they are so much concerned.[295]

Anatomy is about explaining the constitution and/or operation of complex, organized structures through the exploration of some internal complexity inaccessible to direct observation.

Hume's anatomy of human nature reflects the same features. Human beings belong to a natural historical category that can be studied in at least two ways, either as natural entities or as moral agents. These are two different ways of studying the same thing, but both are based on the same commitment, namely that

> nature has preserv'd a great resemblance among all human creatures, and that we never remark any passion or principle in others, of which, in some degree or other, we may not find a parallel in ourselves. The case is the same with the fabric of the mind, as with that of the body. However the parts may differ in shape or size, their structure and composition are in general the same. There is a very remarkable resemblance, which preserves itself amidst all their variety.[296]

Anatomical study thus presupposes a commitment to the structural uniformity of human nature.

This commitment is in concert with Hume's Rules 4 and 5 (*T* 1.3.15.6f), which claim that the same effects must be traced back to some similarity in their causes, a conviction which is to be retained in the study of human nature, too: "human nature remains still the same, in its principles and operations. The same motives always produce the same actions: The same events follow from the same causes" (*EHU* 8.7).[297] Methodologically speaking, this is a commitment to processing empirical material on the assumption of structural uniformity, with an attention to the causal contribution of structural elements, or in other words: the task is to identify the functional ingredients, i.e. *faculties* of human nature and their characteristic role in producing human action and internal functioning. This inquiry yields the principles of various faculties to be relied on in the explanations of moral philosophy, and therefore these structurally fundamental principles of human nature are the proper aim of inquiry in the science of man.

Even though on the most common interpretation "Hume rejected faculty psychology ... and saw the mind instead as a single chain of basic impressions and ideas",[298] these principles are subsumed under specific faculties like reason, imagination, sympathy, etc. whose interaction explains why our impressions and ideas follow one another in the order they do.[299] Hume himself seems to give support to the common interpretation with his famous dictum that only successive perceptions constitute the mind.[300]

This seems to suggest that there is nothing to the mind over and above perceptions, which is true in one sense, but false in another. As far as its *contents* are concerned, the mind consists exclusively of perceptions; but there are also *principles* that underlie the systematic connections among perceptions, and these principles are the actual aims of Hume's inquiry. So, he cannot deny them at least an instrumental commitment, but actually he occupies a realistic stance as is obvious from his distinction between "permanent" and "changeable" principles of human nature.[301] Revealing them requires a philosophical approach, because they cannot in themselves be perceived, only inferred by the appropriate method on the basis of what we can observe.[302]

There are, however, at least two contexts that may seem to undermine the interpretation that Hume is committed to some version of faculty psychology. The first is a passage in which he explicitly rejects any appeal to faculties as an explanatorily empty verbal trick:

> But as nature seems to have observ'd a kind of justice and compensation in every thing, she has not neglected philosophers more than the rest of the creation; but has reserv'd them a consolation amidst all their disappointments and afflictions. This consolation principally consists in their invention of the words *faculty* and *occult quality*. For it being usual, after the frequent use of terms, which are really significant and intelligible, to omit the idea, which we wou'd express by them, and preserve only the custom, by which we recal the idea at pleasure; so it naturally happens, that after the frequent use of terms, which are wholly insignificant and unintelligible, we fancy them to be on the same footing with

> the precedent, and to have a secret meaning, which we might discover by reflection. The resemblance of their appearance deceives the mind, as is usual, and makes us imagine a thorough resemblance and conformity. By this means these philosophers set themselves at ease, and arrive at last, by an illusion, at the same indifference, which the people attain by their stupidity, and true philosophers by their moderate scepticism. They need only say, that any phænomenon, which puzzles them, arises from a faculty or an occult quality, and there is an end of all dispute and enquiry upon the matter.[303]

Prima facie, it might seem that faculty is just like the term 'substance', a word without a proper idea attached to it. It seems to function as a magic word that can be invoked in order to put a decisive end to further explanatory claims by conjuring an illusion of explanation.

Hume's aversion to explanations couched in terms of faculties was fairly widely shared those days. Locke, for example, also points out the tautological character and explanatory emptiness of any appeal to faculties; as such it was a public statement against Aristotelian explanations.[304] There are similar tendencies in contemporary medicine and natural philosophy, too. The Newtonian John Keill's introductory text to natural philosophy, which might have been well-known to Hume,[305] also complained about the explanatory emptiness of 'faculty' in the hands of the "*Perpateticks*" who, instead of discovering causes, had "invented such Terms, as are very fit to express natural Actions." This, however, does not mean that one should be "ashamed to use" such terms as "*Quality, Faculty, Attraction*, and the like", only that we should not "pretend to define the true and physical Cause or Modus of Action".[306] James Keill and Cheyne also had a similar attitude towards faculties and occult qualities. So, with a Newtonian revision, faculty-talk becomes permissible: having declared the relevant aversion, faculty-talk is allowed on the understanding that faculties are not independently identified (or postulated) causes and we do not know their "Natures"; but they can be inferred from the phenomena, and can be understood as "Actions".[307]

In a similar sense 'faculty', unlike 'substance', is made frequent positive use throughout the *Treatise* referring to various components of the human mind: Hume

abundantly talks about our faculty of reasoning, or the faculties of memory and imagination etc., and their various principles – not as independently identified causal sources, of course, or postulates of some preconceived hypothesis in the framework of which experience is to be interpreted, but as conclusions of comparative analyses, ingredients of human nature whose identity depend on whether the analysis of relevant observations is correct.[308] In Hume's case it means that inquiry does not begin with the definition of faculties, and explanations do not proceed from those definitions; instead, inquiry begins with observations and reveal, through analogies, their systematic connections, which will result in the principles that describe and identify the characteristic activities of faculties. Phenomena are given, their analysis is fallible, so the principles or faculties of human nature may be mistakenly identified; yet they are the aims of inquiry.

The other context that can pose a problem here is created by those passages in which Hume denies that a tenable distinction can be drawn between power and "the *exercise* of it".[309] Although sometimes it is interpreted as though it was a rejection of faculty-talk proper,[310] it is instead a sign of the Newtonian revision of faculty-talk that refuses to speculate about the nature of faculties independently of their effects. And even if we have no independent means to identify faculties, we can identify them through their activity, i.e. the influence they exert on the train of impressions and ideas. When Hume claims that "neither man nor any other being ought ever to be thought possest of any ability, unless it be exerted and put in action",[311] he only means that faculties cannot be known independently of their exercise. We can only know faculties through their effects, i.e. know them functionally and inferentially, without the possibility of independent identification. Instead of explaining away faculties in Hume, I suggest to take them to be identified through their principles, i.e. through the causal contribution they make to the train of perceptions.

Hume's way of enlarging moral philosophy

Although there are some, who read Newton's vision for moral philosophy in Query 31 as the "logical starting point" of Hume's philosophical enterprise,[312] this seems to be a mistaken perspective. In this query, Newton expresses his hopes that moral philosophy will be refined *through* the perfection of natural philosophy. Hume, however, does not try to establish continuity between the *content* of natural and moral philosophy,[313] some occasional detours (especially while discussing passions) notwithstanding, Hume takes pain to separate the domain of moral and natural philosophy. For example, when the question of the origin of the impressions of sensation arises, he claims that it does not belong to moral but to natural philosophy,[314] and elsewhere that theories on this matter are irrelevant for understanding the actions of a moral agent.[315]

So moral philosophy for Hume is not an extension, let alone part of natural philosophy, not even when they study the same phenomena, i.e. human functioning; and not even if they are contiguous in some cases like that of the connections between organs and faculties – still, they differ in their perspectives and partly in the phenomena they study.[316] The questions of physical implementation belong to natural philosophy and anatomy proper, and can have at most only peripheral relevance for the moral philosopher. What natural philosophy can provide Hume's moral philosophy with are some stimulating similes and metaphors and, first and foremost, the proper *method*. Moral philosophy follows the same methodological path. Its aim with respect to the phenomena it studies is the same as the aim of natural philosophy in its own field: namely explanatory reductionism, and this methodology ensures the continuity of the two fields of study.

Hume's moral philosophy deviates from Newton's vision in another, even more important respect. In Query 31 Newton envisages the enlargement of moral philosophy through our improving knowledge of the first cause, which immediately sets up a theological framework within which the whole enterprise is to be conducted. Nothing could be further away from Hume's outlook than this. For him, moral philosophy (and for that matter, natural philosophy too), is an inner-worldly enterprise that has no reference to transcendence or even teleology,[317] and what is more, given our faculties we

cannot hope for success if we direct our reasoning in the latter direction.[318] Practical morality founded on the anatomy of human nature concerns only the well-being of individuals and societies in this world, and it can have nothing to offer to satisfy the desire for transcendent significance. Quite the contrary: by revealing hidden causes of phenomena, moral philosophy contributes to the cure from religious hypotheses and superstition.[319]

While the bulk of contemporary inquiry into natural and moral phenomena was made sense of in a *religious* ideological framework within which cognitive enterprise was represented as a contribution to the fulfilment of our transcendent aspirations,[320] Hume represents a different turn of mind that places the emphasis on intelligibility and usefulness.[321] Moral philosophy for him is "first philosophy" in the sense that it tells us where the boundaries of human cognition are, and more generally, it gives a theory of the functioning of moral agents. The chief use of this science of man, like any other science "is to teach us, how to control and regulate future events by their causes", so that we can apply this knowledge in the interest of society.[322]

Hume's moral philosophy aspires to be justified by the ideology of *improvement* that became increasingly dominant in natural inquiry in eighteenth-century Scotland. Within this ideological framework the significance of inquiry was seen as consisting in the improvement of existing practices, and it was therefore focused on proximal causes that required observation and experimentation, rather than reliance on overarching explanatory theories. This ideology had started to become widespread from the late seventeenth century, and Hume's friends, like William Cullen, Joseph Black, and Henry Home (Lord Kames), conducted a significant part of the research so inspired in chemistry relating to medical and agricultural matters – and Hume's anatomy of human nature can be read as a case in point too.[323] And although this line of inquiry was distanced from the religious overtones of Newton's work, most of the methodological inspiration in chemistry, medicine, and Hume's science of man originated in the aftermath of Newton's *Opticks*.

V. Hume and the Changing Ideology of Natural Inquiry

Natural theology, or physico-theology as it is sometimes called, was unquestionably an important part of early modern natural inquiry. The need for a discipline that aimed at an understanding of God through the study of his creation arose from the widespread conviction that the world is the product of God's handwork. As such, God's intentions, attributes and purposes were naturally taken to be reflected, to some significant degree, not only in the Bible but in his creation as well: God had written two books to be studied by different means, i.e. the Bible and the "Book of Nature".[324] Being the two books ascribed to the authorship of God, knowledge about the world perceived as God's creation had to be reconciled with knowledge contained in Holy Scripture perceived as God's word. In this enterprise the resources of natural philosophy and theology had to be combined so as to reach a joint cognitive purpose: a Christian understanding of the world.

As Stephen Gaukroger points out, this aspiration was especially strong among the "Royal Society apologists" who, in the aftermath of Robert Boyle and Thomas Sprat,

> were talking of natural philosophy in terms of a religious office, and natural philosophy was taken as a non-partisan way – that is, one free of sectarian confessional issues – of engaging religious questions of divine nature and purpose.[325]

Andrew Cunningham, in a similar vein, sees the role of natural theology in early modern natural inquiry as so central that on this basis he denies the continuity of natural philosophy and modern science. Natural philosophy is about God even when its practitioners are not talking about him, a feature entirely uncharacteristic of modern science:

> no-one ever undertook the practice of natural philosophy without having God in mind, and knowing that the study of God and God's creation – in a way different from that pursued by theology – was the point of the whole exercise.[326]

And even if John Henry's verdict in the debate surrounding Cunningham's thesis may very well be true, namely that "[n]atural philosophers, after all, were not theologians, and would have seen it as a betrayal of their natural philosophical principles to invoke God's direct intervention in their explanations",[327] the conviction that natural philosophers are studying God's creation provided the basic *ideological framework* of early modern science: this was a background presupposition against which significance of the enterprise was perceived and the ultimate meaning to its findings was ascribed. This ideology of knowledge was not superadded to the works of knowledge production: it was an intimate and unavoidable part of the framework of intelligibility, and not external to knowledge claims themselves.[328]

This stance concerning the significance of natural philosophy is very well reflected in Newton's writings throughout his *oeuvre*. The anti-Cartesian position he elaborated in the 1670s was partly motivated by theological reasons.[329] As opposed to Descartes's model of the universe that required no intervention for its maintenance,[330] Newton's model entailed a voluntaristic theology that supplied the world with God's necessary intervention and regulation.[331]

Newton's views on the close connection between theological and natural knowledge were frequently echoed among his early eighteenth-century Scottish followers. George Cheyne in his 1715 *Philosophical Principles of Religion, Natural and Revealed* discusses in two parts the extent of our knowledge of God to be gained through the study of nature, and the prospects for coupling the arithmetic of infinites with revealed religion. Although in this work Cheyne was sensitive to the limitations of combining religion with knowledge of nature, he simply perceives the aims and insights of natural philosophy as intrinsically unified with Christian religion.[332]

Perhaps the most original Scottish Newtonian, Colin Maclaurin in his introduction to Newton's ideas posthumously published in 1748, the year when Hume's

first *Enquiry* was published too, also sees the significance of natural philosophy in leading

> to the knowledge of the Author and Governor of the universe. To study nature is to search into his workmanship: every new discovery opens to us a new part of his scheme. Our views of Nature, however imperfect, serve to represent to us in the most sensible manner, that mighty power which prevails throughout, acting with a force and efficacy that appears to suffer no diminution from the greatest distances of space or intervals of time; and that wisdom which we see equally displayed in the exquisite structure and just motions of the greatest and subtilest parts. These, with perfect *goodness*, by which they are evidently directed, constitute the supreme object of the speculations of a philosopher; who, while he contemplates and admires so excellent a system, cannot but be himself excited and animated to correspond with the general harmony of nature.[333]

This is the context in which in this chapter I wish to focus primarily on Hume's sections in the first *Enquiry* discussing miracles and particular providence. The intricate connection between these two passages have been already noted,[334] but their historical relevance is most typically detected in the context of religious debates. Here I wish to suggest that in these sections Hume challenges the foundations of those claims of knowledge that concern the connection of the transcendent and natural spheres. This perspective, illustrated above, implies the cognitive authority of revealed religion on the one hand, and suggests the transcendent implications of natural inquiry on the other.

Hume has complaints against this view in both respects: in the *Enquiry*'s section "Of Miracles" he denies that revelation can have relevance for natural inquiry in exploring the ways of nature; "Of a Particular Providence and Future State" denies the possibility of incorporating natural philosophical insights into the Christian understanding of the world. The lesson is that natural theology is bordering superstition as Hume understands it in contrast to philosophy:

> superstition is much more bold in its systems and hypotheses than philosophy; and while the latter contents itself with assigning new causes and principles to the phænomena, which appear in the visible world, the former opens a world of its own, and presents us with scenes, and beings, and objects, which are altogether new.[335]

Despite undermining the cognitive authority of religion, Hume leaves open, at least in the first *Enquiry*, the possibility that religion can have non-cognitive but moral value. Therefore Hume's critique of religion in these two sections concerns only the epistemic status of religion, and thereby he contributes to the emergence of a secular ideology of natural inquiry. This is the significance of Hume's teaching in the context of contemporary knowledge production that I would like to spell out here.

Revealed Religion and Knowledge of Nature

As his correspondence testifies, Hume originally conceived his argument against the reliability of miracle reports while discussing with a Jesuit at the time of writing up the *Treatise* in La Flèche around 1735.[336] Yet, he eventually decided not to include it in the published text fearing, as he explained in another letter, that it "will give too much offence".[337] Cheyne's work mentioned above may have served as an important inspiration for the critique advanced against testimony on miracles and the argument from design in the *Enquiry* as well as in *Dialogues on Natural Religion*.[338]

As Hume sees it, testimony on miracles provides the sole foundation of Christian religion: the "authority" of both "scripture and tradition" rests exclusively on the testimony of the apostles.[339] This authority for Hume cannot be but *cognitive authority*: a claim of knowledge which must be evaluated in the context of other claims of knowledge, a source of epistemic value to be judged in comparison with other sources.

Right from the beginning, Hume discusses miraculous testimony and the questions of religion in a cognitive context, not contemplating the possibility that miraculous testimony or revelation could be a special source of epistemic value that is to be judged by standards different from more common sources of knowledge. Miraculous testimony is placed alongside profane testimony and by Hume's standards they are to be judged uniformly, and therefore testimony in religious matters is treated just as a special case of the more general problem in the epistemology of testimony.[340] The speciality of miraculous testimony in religious matters is due to the fact that "the violations of truth are more common in the testimony concerning religious miracles",[341] because "if the spirit of religion join itself to the love of wonder, there is an end of common sense; and human testimony, in these circumstances, loses all pretensions to authority."[342]

This exclusively cognitive perspective is also reflected in Hume's recurrent use of the phrase "system of religion" which is much more frequent in this section than in Hume's other discussions of religious phenomena.[343] Given the several other contexts in which Hume uses 'system', he seems to imply that religion is an organized body of knowledge on a par with systems of natural and moral philosophy, and therefore it has to be judged by the same epistemological standards. By these standards, religion counts as a body of empirical knowledge: sacred texts and tradition report natural and historical events that are frequently miraculous; make predictions in the form of prophecies; and provide explanations that are again frequently miraculous. These are all statements on factual matters, and therefore the epistemic value of revealed religion is to be measured by an appeal to the court of experience in front of which miracle reports can be either rejected as falsities or admitted as "proofs" or "probabilities".

The categories of proof and probability in Hume's epistemology are reserved for empirical knowledge claims, and they are contrasted with the certainty of *a priori* truths that amounts to a "demonstration". The difference between proofs and probabilities consists in their different degrees of certainty. Proofs are "such arguments from experience as leave no room for doubt or opposition"[344] and laws of nature are supported by such arguments. Probability arises "where different effects have been found to follow from causes, which are to *appearance* exactly similar, all these various

effects must occur to the mind in transferring the past to the future, in all our inferences".[345]

It is to be emphasized that "proof" and "probability" are epistemic categories that concern the nature of our knowledge, and not ontic categories that concern the nature of the things in themselves. Therefore, even if we have full proof for an event to occur in specific circumstances, it may turn out to be otherwise in the future. And similarly, the fact that on the basis of past observation we can only ascribe a certain probability to events arising from causes that are "to *appearance* exactly similar", does not entail that those events could not be subsumed under strict laws should we inquire further into their hidden constitution or should we have more perfect cognitive faculties.

Now, in front of the court of experience, miraculous testimonies cannot stand a good chance for being accepted as proofs because unanimous experience speaks against them. Hume defines "miracle" as

> a violation of the laws of nature, and as a firm and unalterable experience has established these laws, the proof against a miracle, from the very nature of the fact, is as entire as any argument from experience can possibly be imagined.[346]

Although Hume draws a distinction between two kinds of extraordinary phenomena, namely the "miraculous" and the "marvellous", the two categories, given Hume's definition, seem to merge.[347] As the famous example of the Indian prince, who refuses on the basis of his past experience to believe that water can be frozen and perfectly hard, seems to suggest, the distinction between the two category consist in that a miracle is contrary to uniform experience, while a marvel is just "not conformable to it".[348] The distinction is indeed problematic if miracles, in connection with proof and probability, are discussed as an epistemic category. Given the epistemic conditions of the Indian prince and his society it may well have been a law of nature supported by unanimous experience that 'water is always in liquid form', and for him the report on the existence of frozen water may legitimately seem miraculous, and not only marvellous.

Given Hume's definition, a system based on miraculous testimony is by definition in epistemic disadvantage if compared to natural philosophical systems that establish the laws of nature by uniform observation and experience. And given that miracles, especially those reported by sacred texts, are typically unique – i.e. a single case reported by a single person –, their probability is negligible against the uniform experience that speaks against them. Even if truthfulness could be presupposed as a convention with full compliance among members of a community, miracle reports cannot be trusted, because there are several other circumstances: mistakes, misperceptions, and other distortions like the agreeable passions "of *surprize* and *wonder*, arising from miracles"[349] whose possibility should make us suspicious as to the truthfulness of a miracle report.

Our reliance on testimony is derived exclusively from "our observation of the veracity of human testimony", namely that we find memory is "tenacious to a certain degree", and that people have "an inclination to truth" and "sensible to shame, when detected in a falsehood".[350] But we equally know from experience that there are conflicting testimonies that may arise from the "character" of the witnesses or the "manner of their delivering their testimony".[351] All these circumstances are to be weighed while deciding on whether to accept a testimony as proof or probability, or reject it altogether. And even if all disturbing circumstances could be eliminated, and therefore a miraculous testimony were to be accepted, there would still be proof against proof – one perfectly reliable testimony against unanimous experience, which at most can entail a "mutual destruction of arguments".[352]

Our knowledge of the limited reliability of human testimony should make us cautious during the process of evaluating testimonies: we should proportion our belief to the evidence.[353] And testimony as evidence is, and should be always vulnerable because of our knowledge of its fallibility. Therefore, when testimony conflicts with past experience that amounts to full proof, testimony is bound to be rejected, no matter who provides it, the apostles, Cato, or whoever we may be inclined to trust: "The incredibility of a fact … might invalidate so great an authority."[354] As Hume's normative epistemological principle has it, "no testimony is sufficient to establish a miracle, unless the testimony be of such a kind that its falsehood would be more miraculous, than the

fact, which it endeavours to establish".[355] And given our knowledge of the fallibility of human testimony it is hard to imagine a case like that, and therefore "perhaps, it will be impossible to find any such in all records of history".[356]

As Stephen Shapin has pointed out, Hume's impersonalized standard of testimonial acceptance reflects the changing standards of credibility.[357] For most of the early modern period personal *virtue* was considered to be the foundation of trust in one's testimony: as truthfulness was associated with certain virtues by which certain types of persons could have been identified as reliable. The gentleman was the ideal participant in knowledge making practices whose virtues like gentility independence, integrity, and identity, in connection with his economic and social status, ensured his reliability. For Hume, however, these features and character traits are irrelevant in evaluating testimonial support for knowledge claims. Although "integrity" and "reputation" remain important features of the witness because they warrant his personal credibility especially when testimony is given in "a public manner" so as to make the detection of falsity unavoidable, Hume does not connect these virtues to social status. And what is more important, he places the primary emphasis on "unquestioned good sense, education, and learning",[358] which suggests that Hume is inclined to replace personal virtue by *expertise* thereby gesturing toward the detachment of moral considerations from the cognitive value of testimony.[359] Having the moral standing of a prophet or an apostle or Cato contributes little to the credibility of a testimony without being a competent observer.

A competent observer should always be reluctant to accept a miracle report not only because it is potentially always fallible and confronted with full proof, but also because a competent observer must have several methodological precepts in mind that should prevent him from admitting such testimony. Admitting a miracle as empirical evidence would violate sober cognitive norms like that of *explanatory reduction* that suggests we should aim in our cognitive enterprises at subsuming phenomena under a limited number of laws.[360]

This norm arises from the empirical study of human nature that reveals the "maxim" that the observation of past events is a good guide for our expectations of future and unobserved phenomena.[361] But if miracles are admitted as real phenomena in

nature then the "whole frame of nature is disjointed, and every element performs its operations in a different manner, from what it does at present,"[362] and therefore admitting miracles violates this norm which has firm foundations not only in the proper methodology of natural philosophy but in human nature itself. Hume's principle of explanatory reductionism recommends parsimony in introducing new principles for new phenomena and fortitude with respect to established explanatory principles, i.e. laws of nature. Against this background, religious accounts of miracles are *par excellence* cases of introducing *ad hoc* and experientially unfounded principles in our explanations, which indicates reliably that these principles are false.[363]

Furthermore, different miracles are admitted in different systems of religion that are inconsistent with one another, because "the direct scope" of a miracle

> is to establish the particular system to which it is attributed; so has it the same force, though more indirectly, to overthrow every other system. In destroying a rival system, it likewise destroys the credit of those miracles, on which that system was established; so that all the prodigies of different religions are to be regarded as contrary facts, and the evidences of these prodigies, whether weak or strong, as opposite to each other.[364]

This has two consequences. First, a miracle is not a piece of independent evidence that can be treated as such while constructing systems for explaining phenomena, its only function is to establish a system to which it belongs. The examination of a reported miracle, none the less its acceptance as veridical, presupposes the system which treats it as a piece of evidence. As Hume puts it in a comment on the manuscript of George Campbell's *Dissertation on Miracles* that attacks Hume's position concerning miracles: "I never knew any one, that examined and deliberated about nonsense who did not believe it before the end of his inquiries."[365] This means that a system of religion is immune to cognitive critique from the outside, and the evidences it relies on can have epistemic value only within the frames of that particular system.

Secondly, but not independently, systems founded on their own peculiar miracles are mutually destructive if evaluated from an independent point of view. We have rival systems with mutually exclusive explanatory and predictive content, but whose comparative evaluation is impossible due to their claiming the relevant evidence to be exclusively theirs and inaccessible for others. This begets a situation in which theory choice is impossible on the basis of cognitive evaluation. This consequence undermines the methodological credibility of systems of religion in accounting for phenomena, and bestows an epistemic advantage upon every system of natural philosophy that keep an eye on these epistemic norms.[366]

Prima facie it may seem that Hume's methodological ban on accepting miraculous testimony threatens not only the knowledge claims posed by systems of religion, but also the experimental practices of early modern natural philosophy. When Thomas Sprat, an early historian of the Royal Society, proclaimed that miracles are divine experiments, he also implied that experiments conducted by natural philosophers are analogous with them in being contrary to the commonly observed course of nature.[367] As Lorraine Daston and Katherine Park put it, the "sciences of nature during this period produced and consumed marvels as never before or since" and this practice was combined with the conviction that "the sciences would thereby grow".[368]

The practice of experimental natural philosophers entailed the production of phenomena that might seem miraculous and marvellous as Hume understood the terms, i.e. as phenomena contrary or not conformable to uniform experience, and natural philosophers circulated these findings in the form of experimental histories, i.e. testimonies. The production of seemingly miraculous phenomena was conjoined with an appetite for collecting observations of preternatural, outlandish and extraordinary phenomena that "would serve as an observational approximation of controlled experiments – or rather, as a record of the experiments nature performed on itself."[369] These phenomena were crying out for an explanation and many of them met the epistemic criteria Hume set for miracles and marvels.[370]

Hume, however, allows for the possibility of a miraculous testimony to be "very extensive and uniform" so as to amount to a proof. This would be a case in which

sufficient number of people with a sufficient degree of credibility would testify some miraculous event:

> suppose, all authors, in all languages, agree, that, from the first of January, 1600, there was a total darkness over the whole earth for eight days: Suppose that the tradition of this extraordinary event is still strong and lively among the people: That all travellers, who return from foreign countries, bring us accounts of the same tradition, without the least variation or contradiction: It is evident, that our present philosophers, instead of doubting the fact, ought to receive it as certain, and ought to search for the causes whence it might be derived.[371]

In these, for Hume unlikely, cases the methodological rule is clear: inquire further – except the event is so unbelievable and contrary to the laws of nature that it does not deserve serious consideration,[372] which is the case especially when a miracle report is connected to some system of religion.[373] A successful search for the causes of allegedly miraculous events entails the *Entzauberung* of the miracle, i.e. it entails the event losing its status as a miracle.

For Sprat a miracle seemed to be a more common phenomenon than it was for Hume, because for Sprat "there are many *Qualities*, and *Figures*, and *Powers* of things, that break the common Laws, and transgress the standing Rules of *Nature*". But his attitude to such miraculous phenomena is quite consonant with Hume's: their causes are to be explored as "it is certain that many things, which now seem *miraculous*, would not be so, if once we come to be fully acquainted with their *Compositions* and *Operations*."[374]

So, Hume's preference for an inner-worldly explanation of natural events, even if miraculous, was shared by many early modern British naturalists. As Boyle pointed out, invoking a "supernatural cause" while studying natural phenomena "will, I fear, look like shifting off the difficulty, instead of solving it; for we here enquire not into the first and universal, but the proper, immediate, and physical cause".[375] This preference could be easily extended to miracles reported in the Scripture: it was a potential task of the

early modern natural philosopher to understand these events in terms of their secondary causes.[376]

However, Hume strictly diverged from the followers of Boyle and Newton in the interpretation of such potential explanatory successes: for the former a successful explanation of a miracle meant that the miracle is in fact *explained away* and it ceases to be a miracle; for the latter it just meant that the miracle is simply *explained* in terms of the causes by which God had wrought the miracle. But, actually, with respect to religious miracles Hume is more radical than that. The most fundamental difference between the Royal Society apologists on the one hand, and Hume on the other reflects different attitudes to the miracles testified by religious tradition. For Hume inquiring into miracles reported by religion is simply pointless – our knowledge of human nature, which is based on history and observation, tells us that

> the violations of truth are more common in the testimony concerning religious miracles, than in that concerning any other matter of fact; this must diminish very much the authority of the former testimony, and make us form a general resolution, never to lend any attention to it.[377]

By contrast, for Boyle "a naturalist may safely believe all the miracles attested by the holy scriptures",[378] and as he says elsewhere, those miracles "have a peculiar advantage above most other miracles, on the account of their duration: since the manifest proofs of the predictions continue still, and are as visible as the extent of the christian religion."[379]

The main difference between Royal Society apologists and Hume does not consist in the way they suggest to treat miraculous phenomena once they are admitted as phenomena, but in the kind of testimony required for admitting a phenomenon worthy of inquiry. As John Henry points out a voluntaristic theology that allows for miracles ascribed to God's will is consistent with secondary cause searching –[380] and this is what Hume denies: he does not admit divine miracles as phenomena that deserve to be inquired into. Hume sets the threshold for belief in a miracle report higher than most of his predecessors.[381] For Hume, as we have seen, taking religious testimony seriously

presupposes religious belief and we know from experience that testimony arising from religious motivation is highly unreliable. Therefore it cannot serve as a foundation of a system with cognitive aspirations, but belief in revealed religion has no other source – thus the knowledge claims of revealed religion are disqualified.

Knowledge of God from Knowledge of Nature

The *Enquiry*'s Section XI on particular providence continues to adopt an epistemic perspective on matters of religion, and he repeatedly talks about the "religious hypothesis" that "must be considered only as a particular method of accounting for the visible phænomena of the universe". (11.18, see also 21, 26, 27) If compared to the section on miracles, here the epistemic perspective is reverse: Hume is no longer concerned with the epistemic prospects of establishing natural knowledge on revealed religion, but with the prospects of distilling knowledge of God from knowledge of nature.

In this respect this section is a close relative of Part II of Section VIII in which Hume discusses the possibility of knowing God through studying human actions. Here Hume explains his reasons for rejecting this possibility with respect to moral philosophy. First, he illustrates that our moral practice is based on the experience of constant conjunction and on analysis–synthesis, and thus it is continuous with philosophical inquiry. Moral evaluation springs from the action's motivation, which is inferred on the basis of previously observed conjunctions between actions and motivations. Were there no such conjunctions, actions could not provide evidence for motivation, and consequently for moral evaluation.[382] Inferences from action to motivation presuppose a constant conjunction between types of action (virtuous or vicious) and relatively stable types of motivation (virtues, character traits, passions), a conjunction that gives rise to the impression of necessity in moral phenomena. Thus Hume shows that our moral practice is founded on the same idea of necessity as our reasoning about moral (and natural) matters.

Second, the lesson he offers about moral practice leads to the problem of theodicy and thus to a possible objection to Hume's theory of necessity – at least in moral matters. If, relying on Humean necessity, actions are traced back to their motivations, and motivations to the circumstances influencing them, and the circumstances to other preceding circumstances, then we eventually arrive at "the Creator of the world". From this angle two things can be said: either our actions cannot be wrong because ultimately they spring from a good cause, or they can be wrong, but then the Creator must share in the blame. As neither horn of this dilemma is possible, Hume's doctrine of necessity is untenable – so argues Hume's imagined opponent.[383]

Hume rejects the dilemma altogether. On the one hand he argues that the perspective of moral evaluation is much narrower in practice than to be sensitive to the entirety of this alleged causal chain. It is possible to argue that some particular wrong could arise from general laws that are otherwise right if considered from the perspective of the whole; or that some morally wrong action fits into the causal texture of the world so that it prevents something even worse or facilitates some future good: yet, these arguments cannot alter our natural moral sentiments that respond to particular actions.

Moral judgements are founded on "the natural sentiments of the human mind",[384] and our moral sense, which responds naturally to character traits in relation to their contribution to sociability, is not susceptible to the conclusions of abstract reasoning. On the other hand, prima facie it seems as if Hume could not find an effective argument against the second horn of the dilemma. Well, says Hume, if the Deity is the distant cause of our actions then it is unavoidable that the Deity be the cause of our vicious actions too.

But the point of real importance comes only after this:

> These are mysteries, which mere natural and unassisted reason is very unfit to handle; and whatever system she embraces, she must find herself involved in inextricable difficulties, and even contradictions. . . . Happy, if she be thence sensible of her temerity, when she pries into these sublime mysteries; and leaving a scene so full of obscurities and perplexities, return, with suitable modesty, to

> her true and proper province, the examination of common life; where she will find difficulties enow to employ her enquiries, without launching into so boundless an ocean of doubt, uncertainty, and contradiction![385]

Thus Hume's response to the second horn is that reason is simply unequipped for solving the problem of theodicy, and thus the problem is placed outside the appropriate realm of philosophy, at least as it is defined by Hume's standards of experimental reasoning.

And this is the note on which Hume reaches his conclusion: on the basis of our interpersonal practices and philosophical reasoning it is impossible to answer the questions about the Deity, and the Deity's relation to the world. That is to say, these problems are unsolvable from a human point of view at all, because the solution, if there is any, lies outside the boundaries of reason. Thus Hume commits himself concerning a question of central importance in contemporary natural philosophy, but in Section VIII he approaches the problem from the angle of moral philosophy. By declaring the problem of theodicy unsolvable and the science of man unfit for the contexts of transcendence he articulates an ideology of natural and moral knowledge: he detaches the questions of knowledge of nature and human nature from the questions of knowledge and knowability of God and his purposes. For Hume the problem of theodicy is relevant only in this cognitive context, and it does not have a general import for the critique of religion here. Rather it drives toward a secular ideology of knowledge that distinguishes the modern natural and social sciences from the main tenet of early modern natural and moral philosophy.

So Hume concludes that studying man with the methods of experimental reasoning is unfit to handle the questions of transcendence, and thus moral philosophy should remain content with "the examination of common life".[386] Hume's attitude in section XI concerning the prospects of knowledge in transcendent matters through natural philosophy is quite similar. Although this section is couched in dialogue form, this fact from the present perspective does not pose a serious problem: its methodologically relevant considerations are consonant with Hume's other pronouncements.

As Thomas Holden has pointed out recently, Hume's argument aims to defeat the traditional program of natural theology, as has been illustrated in the introduction, i.e. "the program of employing natural reason to work our way to species-specific knowledge of the intrinsic character of the original cause".[387] But Hume does not refrain from exploring the limits of the kind of knowledge we may acquire of the original cause, and this exploration may be seen as giving rise to Hume's "liminal natural theology" that is "highly unorthodox, negative and irreligious".[388]

If religion is to be founded on the "principles of reason"[389], as opposed to, say, revelation or innate ideas, then these limitations are especially clear. Talking about God and his properties is talk about existence and matter of fact, and in these questions no *a priori* argument can be successful.[390] Putting revelation on one side, the exploration can only start from the relational characterization of God as the cause of the "order of nature": "from the order of the work you infer, that there must have been project and forethought in the workman". As Hume rightly points out, "this is an argument drawn from effects to causes",[391] and as such it must conform to the general methodological rules of experimental reasoning.[392]

There is nothing special in the methodological requirements set for natural theology: they are continuous with those of natural and moral philosophy in general, and indeed with the rules everyday reasoning from which they are refined. Hume's experimental method of finding causes derives from a study of everyday causal reasoning and consists in a more conscious, reflected and sophisticated application of it. The empirical study of everyday causal reasoning is thus the source of the normative canon of cause-searching which provides the "logic" equally characteristic to reasoning in moral and natural philosophy – and of course, to a lesser degree of precision and rigor, to everyday reasoning too.[393]

In the specific context of evaluating the cognitive limitations of natural theological reasoning Hume invokes a set of such rules. First: "When we infer any particular cause from an effect, we must proportion the one to the other, and can never be allowed to ascribe to the cause any qualities, but what are exactly sufficient to produce the effect."[394] A rule equally applicable while exploring the properties of "brute unconscious matter, or a rational intelligent being."[395] The practical consequence of this

rule is that no property, intention or motivation can be legitimately ascribed to the original cause that is not required to explain the effects, i.e. the universe. Therefore, it is implied, the traditional properties of the Christian God, like perfect goodness, omniscience, omnipresence, omnipotence etc., cannot be vindicated on the basis of natural theology, because the world should look quite differently if the original cause had all these attributes. Albeit an inference is possible here, it is insufficient to satisfy the aspirations of a Christian natural theology.

Secondly and consequently, the method of analysis and synthesis, which Hume almost explicitly endorses as the universal method of natural and moral philosophies,[396] can have only limited use in religious contexts:

> We can never be allowed to mount up from the universe, the effect, to Jupiter, the cause; and then descend downwards, to infer any new effect from that cause . . . The knowledge of the cause being derived solely from the effect, they must be exactly adjusted to each other; and the one can never refer to anything farther, or be the foundation of any new inference and conclusion.[397]

Although the exact terms 'analysis' and 'synthesis' do not figure here, in contemporary usage the terms "mounting up" and "descending" put them into the same family of concepts as 'analysis' and 'synthesis', and they were applied with reference to the search for causes – and this is indeed the case with Hume's usage as well.[398]

The lesson Hume provides here is that analyzing causes from effects cannot proceed arbitrarily. And particularly, we cannot analyze phenomena into the characteristics of some deity. What we can do is to collect relevant phenomena, find analogies between them and ascribe those analogies to similar causes, thereby reducing a variety of phenomena to regular principles underlying them and getting the principles so gained to perform explanatory work. But our knowledge cannot in any case transcend what we can infer on an analogical basis from the effects themselves.

Moreover, the analysis and synthesis on this analogical basis inevitably breaks down should it be applied in the context of exploring God's intrinsic properties. The

problem arises from the uniqueness of the relation between cause and effect in this case. Inference to a cause from its effect is possible only if there is a pool of observations with respect to the specific cause-effect relation, without which the cause could not be revealed by an analysis of the relevant analogies. Only in case of having relevant analogies at hand can "we mount from the effect to the cause; and descending again from the cause", because without the support of "a hundred other experiences and observations … this method of argument must be considered as fallacious and sophistical".[399]

There is thus a crucial lack of analogy between studying natural phenomena and studying God, because

> [t]he Deity is known to us only by his productions, and is a single being in the universe, not comprehended under any species or genus, from whose experienced attributes or qualities, we can, by analogy, infer any attribute or quality in him.[400]

Consequently, the methodology of experimental reasoning cannot be fruitfully extended to God precisely because of his uniqueness. And given that we have no other legitimate way to inquire into questions of existence and matters of fact, we simply have no legitimate way to inquire into the properties of the original cause beyond the empty insight that it was sufficient to cause a world like ours, therefore "it is impossible for you to know any thing of the cause, but what you have antecedently, not inferred, but discovered to the full, in the effect".[401]

Thirdly and consequently, what we can in this particular case infer from the effect concerning its cause cannot establish any new explanation of past phenomena or any new prediction of forthcoming events, because

> If they tell me, that they have mounted on the steps or by the gradual ascent of reason, and by drawing inferences from effects to causes, I still insist, that they

> have aided the ascent of reason by the wings of imagination; otherwise they could not thus change their manner of inference, and argue from causes to effects; … forgetting that they have no reason to ascribe to these celestial beings any perfection or any attribute, but what can be found in the present world. … If you come backward, and arguing from your inferred causes, conclude, that any other fact has existed, or will exist, in the course of nature, which may serve as a fuller display of particular attributes; I must admonish you, that you have departed from the method of reasoning, attached to the present subject, and have certainly added something to the attributes of the cause, beyond what appears in the effect.[402]

Even if an ontological commitment to the original cause cannot be challenged, the enterprise of exploring it through the study of its effect is epistemically infertile because it cannot yield principles for predictive and explanatory success. The experimental method of reasoning can yield no cognitive benefits in this specific case, because we cannot compare various effects and ascribe them to the same cause. We have a unique relation here and we have access only to the effect, and no independent access to its cause – a hopeless epistemic situation.

Hume argues further that taking ourselves as the model of the original cause cannot improve this epistemic situation. Although we can know from experience the principles which govern human design, inclination and action, and on the basis of this knowledge we can draw conclusions concerning human conduct. If human intellect had even if some "remote analogy"[403] to that of the "Supreme Being", then there would be a pool of observations necessary for experimental reasoning. However, "it must evidently appear contrary to all rules of analogy to reason, from the intentions and projects of men, to those of a Being so different".[404] Due to the lack of relevant similarities, human intellect cannot serve as an analogue of the original cause adequate for processing by means of experimental reasoning.

Overlooking these limitations of natural theology results in the imagination going wild creating a fictional "superlative intelligence and benevolence" instead of sticking to the only conclusion that reason can provide: "Let your gods … be suited to

the present appearances of nature."[405] This is the only way natural theology can proceed for Hume, but as we have seen it does not get very far in this way, and it can turn out be "liminal natural theology" at most: a natural theology that tells us something about what the original cause is not like, but silent about its intrinsic character. But if Hume's advice is taken, then that prevents us from tormenting ourselves with problems like that of *theodicy*, which arises merely from a "fruitless industry to account for the ill appearances of nature, and save the honour of the gods; while we must acknowledge the reality of that evil and disorder, with which the world so much abounds."[406]

As a result of these considerations it is natural to conclude that the traditional program of natural theology "entirely unsupported by any reason or argument, can never be admitted but as mere conjecture and hypothesis".[407] The religious hypothesis thus turns out to be a hypothesis in the pejorative sense of the term:[408] a knowledge claim unsupported by an analysis of phenomena, and therefore it can be listed among the "speculative dogmas of religion" that arise from philosophy "allying with superstition".[409] By proclaiming natural theology as superstition Hume changes the frame of significance within which meaning to empirical and theoretical findings can be ascribed. In the early modern period an important source of legitimacy of theoretical work that had no practical relevance was that it contributed to the understanding of God. Hume's challenge questioned this source of legitimacy and he reached a conclusion similar to that offered at the end of Section VIII: reason cannot be extended so as to draw inferences of otherworldy significance.

Even if God did write the Book of Nature he did not equip us with the necessary tools of reasoning for reading it. Consequently, Hume implicitly rejects Newton's and the Royal Society's vision concerning the study of God through nature and the enlargement of moral philosophy through our improved knowledge of the first cause. The main lesson Hume offers is that the knowledge we can gain from studying the first cause in accordance with sober methodological rules, to which Newton and his followers assents as well,[410] are incompatible with claims of transcendent knowledge. So if we are to stick to the only method of experimental reasoning, which is founded on "experience and observation and analogy"[411] and excludes revelation and innate ideas, we should change the ideology of natural philosophy: its religious frame of significance

is to be replaced by an entirely secular one. In this respect, Hume's moral philosophy is certainly not Newtonian.

Secular Ideal of Knowledge and Religious Fictionalism

I have emphasized throughout that Hume in these two sections weighs religion on the scale of epistemic value and cognitive reliability. On this scale he finds that revelation fails to report phenomena worthy of investigation, let alone evidence to be relied on, and also that and empirical reason does not provide a fruitful way to explore the properties of the original cause. Therefore religion should give up all its knowledge claims, and natural philosophers should give up all their aspirations to reach knowledge of transcendence with the experimental method of reasoning – and there is no other viable way in questions of existence and matters of fact. You cannot have the methods and epistemic standards of natural philosophy *and* the conclusions of Christian theism. Knowledge properly so-called can belong exclusively to the secular world.

As we have seen, the edge of Hume's argument in both sections is driven towards those deriving religious belief from "the principles of human reason",[412] which does not in itself exclude the possibility of putting religious belief on a different footing. And, as we have seen, he indeed suggests that religious belief is rooted in human nature is in the functioning of imagination. Having granted this, religious belief may be a miracle, as Hume suggests,[413] by the standards of reason, but it can be accounted for by other principles of human nature, which may suggest that it may have other, non-epistemic functions.[414]

And indeed, while arguing for a secular ideal of knowledge, Hume is not blind to other contexts in which religion may prove to be useful. He contemplates whether religion can have virtues in moral and social respects independently of its poor cognitive performance, and in this context his conclusion is not as straightforward as his epistemic verdict is. For most part of the argument this may not seem to be the case. Section XI starts from the question whether disputes concerning the origin of the world

is "entirely indifferent to the peace of society"[415] or "loosen, in a great measure, the ties of morality".[416] Then in the course of argument it is concluded: past experience teaches us that "in the present order of things, virtue is attended with more peace of mind than vice, and meets with a more favourable reception from the world" and therefore "every advantage is on" the virtuous course of life. Consequently, there is no need beyond this insight for a "divine existence" that guarantees "supreme distributive justice" in order to maintain the order of society. Given that the reasoning that could lead us to the conclusion that there is such a divine existence is fallacious, we have no rational reason to believe its existence and to conduct our actions according to its alleged instructions.[417]

But this is not Hume's last word on the issue. Even if reason cannot vindicate religious precepts of morality and social conduct, the precepts themselves can be useful:

> You conclude, that religious doctrines and reasonings *can* have no influence on life, because they *ought* to have no influence; never considering, that men reason not in the same manner you do, but draw many consequences from the belief of a divine existence, and suppose that the Deity will inflict punishments on vice, and bestow rewards on virtue, beyond what appear in the ordinary course of nature. Whether this reasoning of theirs be just or not, is no matter. Its influence on their life and conduct must still be the same. And those, who attempt to disabuse them of such prejudices, may, for aught I know, be good reasoners, but I cannot allow them to be good citizens and politicians; since they free men from one restraint upon their passions, and make the infringement of the laws of society, in one respect, more easy and secure.[418]

Hume here points out the weakness of the argument that religious considerations can have no influence on our conduct because they have no rational grounding that could provide a compelling reason. But people do draw conclusions and make predictions from their "belief of a divine existence", and even if these are ill founded, they still have an advantageous influence on social conduct. Requiring rational foundations for religion is thus the business of "dangerous friends and disguised enemies to the

CHRISTIAN religion", as they "put it to such a trial as it is, by no means, fitted to endure".[419] The most important consequence of this line of questioning is the removal of breaks and inhibitions that prevent actions harmful to society.

This position can be considered as a form of *religious fictionalism*.[420] It maintains that even if religious teachings are false, their truth-value is not an important property and therefore their cardinal virtue is not epistemic. Rather, their main virtue consists in some other property, namely in their social utility which is reflected in their contribution to preserve society. But even if Hume sees the possibility of a fictionalist position, he does not pursue it very far. This may be due to the intrinsic instability of the religious fictionalist position: A fictionalist disregards the truth-value of religious doctrines as probably false, and therefore he cannot believe in them; yet at the same time he requires action as if the doctrines were true. But if the fictionalist position is accepted, then the truth of religion cannot be part of the motivation for acting according to its commandments, and it is hard to see what else could fill the role of truth here if not the lessons drawn from previous experience concerning the advantages of a virtuous course of life. And in this case religious doctrine is superfluous, past experience takes over its motivating role. Essentially, religious fictionalism boils down to a Pharisaic position: the fictionalist must keep his wisdom to himself, and recommend trust in religion to everyone else in order to ensure the conformity with moral precepts.

Religious fictionalism is thus not an ally of enlightenment: it can preserve the social advantages of religion only if its truth is disguised behind the curtains of theism. Maybe this is one reason why Hume's position is equivocal concerning the non-cognitive uses of religion. On the one hand, there are passages in his *oeuvre* that insists that "there must be an ecclesiastical order, and a public establishment of religion in every civilized community".[421] On the other hand, at other places he is clearly sceptical even about the social advantages of religion, he rather sees the dangers arising from religious zeal and enthusiasm.[422] And he goes much further in his letters, for example in the one addressed to Andrew Stuart in 1775, where he claims that if "all Churches shall be converted into Riding Schools, Manufactories, Tennis Courts or Playhouses", it will contribute to "our Prosperity".[423] But in the epistemological context of the *Enquiry* he merely touches upon these issues.[424]

Exploring Hume's attitude toward religious fictionalism would transcend the limits of the present chapter. What is more important in the present context for a secular ideology of epistemology is that religious fictionalism concedes the cognitive defeat of both revealed and natural religion, and can at most make an instable attempt to save the social advantages of religion. The lesson Hume provides is clear: The failure of religion to meet the epistemic standards of experimental reasoning suggests that it cannot be taken seriously as a system cognitively competitive with natural and moral philosophies. So, whatever other advantages it may have, they must be independent from its epistemic performance.

Hume's Method and Project

VI. Hume's Experimental Method

The adjective 'experimental' with which Hume characterises his method in the subtitle of his *Treatise on Human Nature* is far from being unequivocal. According to a widespread interpretation it refers formally to Newton, and it indicates nothing more than that Hume, like many of his contemporaries, aspired to be as significant for the moral sciences as Newton was for natural philosophy.[425] It is also frequently hinted that the label 'experimental' simply declares Hume's empiricism, and does not imply anything beyond 'experiential': it suggests a method that takes private experience as its starting point and argues from there – as opposed to starting from *a priori* insights and proceeding in a rationalistic guise.[426] Accepting either of these interpretations, one could go even further and conclude that Hume's commitment to an "experimental method" is nothing more than a marketing trick played in order to secure a respectable position for his work in an intellectual climate dominated by Newtonians on the one hand, and a "culture of fact" on the other.[427]

Accepting these interpretations, however, makes impossible to account for some eighteenth-century evaluations of Hume's enterprise, which regard him as being the only one who ever applied the experimental method with any success in this field.[428] And it is also impossible to give a charitable reading of what his subtitle, "An Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects", could mean.

Among those who take Hume and his experimental method a bit more seriously, some parallels with Newton's project are frequently emphasised,[429] but it is sometimes debated whether in this respect his intellectual debts should be paid to Boyle rather than Newton.[430] Others believe that his work is most properly placed within a tradition that applies the Baconian methods of natural history in moral inquiry, a tradition that had begun with Locke and flourished in Scotland at that time.[431] Recently it has also been suggested that Hume, in a similar vein to Buffon, critiques the mechanical and mathematical foundations of experimental natural philosophy as it was envisaged in the seventeenth and early eighteenth centuries.[432]

Given the plethora of competing epistemic ideals of systematic inquiry at the turn of the seventeenth and eighteenth centuries this confusion can hardly be surprising. With the decline of Aristotelian Scholastic natural philosophy and the rise of the Royal Society, the importance of experimental practices had surpassed those of natural historical fact-collecting, but from the mid-eighteenth century natural history became once again prominent thanks to the work of Banks, Buffon and others.[433]

In this context the methodological role and the very concept of 'experiment' were ambiguous. In Boyle it served the purposes of collecting facts for further philosophical elaboration, it was just natural experimental history. But Newton and Hooke typically used it to test alternative hypotheses, just as had been done in the Academia del Cimento. And it served yet another function for Galileo, who used it primarily for establishing premises of formal demonstrations.[434] A common core element in these various concepts of 'experiment' is simply the observation of individual events, sometimes produced in an operative way.

Not only the fact-producing practices of natural inquiry but also the philosophical ways of building explanatory theories seem to be conceptually and methodologically diverse. One could also reconstruct various epistemic ideals that guided the theoretical processing of empirical results. The early ideal of a kinematic mechanism, advocated by Descartes, Boyle and Huyghens, had been replaced by Newton's dynamic mechanism which referred to forces in the explanation of phenomena, a category that was simply unintelligible by the standards of kinematic mechanism.[435] Then in the second quarter of the eighteenth century the ideals of materialism and vitalism became increasingly popular among natural philosophers. That allowed for explanations in terms of qualitative differences and active principles which mechanists had previously expelled from natural philosophy.[436] To this one could also add the debates about the permanently problematic status of mathematics in natural inquiry as well as those about the possibility of natural theology.

The scene is no less confusing in the field of moral philosophy, as it is also burdened with methodological debates mirroring in a way those of natural philosophy. Hume's experimental approach to human nature is but one among many competing methods via which this subject had been studied. Hobbes, being sceptical about

experimental approaches in general,[437] favoured a geometrical method: to derive and thus explain human and political phenomena from a set of true definitions.[438] Locke followed a Baconian "historical, plain method" in producing what is in effect a natural history of human understanding:[439] a description and classification of various cognitive capacities. Butler explored moral phenomena with a teleological view of human nature in mind, understanding its various facets as components of a purposive system, a product of design.[440] These various approaches, and many others, delivered rival images of man and, as a consequence, they entailed different visions of desirable social relations.

As Hume nowhere gives a sufficiently detailed summary of his method, it takes some effort to find out what epistemic ideals he had in mind while developing his theory of human nature. In this chapter I intend to reconstruct what 'experimental' might mean to Hume with an attention to the context of eighteenth-century experimental philosophy. I will do so with a double focus by relying on the then common Baconian division of knowledge which presumed a distinction between historical and philosophical modes of inquiry.[441]

History, both civil and natural, was a descriptive and classificatory enterprise relying on observation and experimentation. The descriptions historical inquiry produced were considered to be the raw material of philosophical inquiry into the principles and causes of phenomena for the purposes of explanation. Searching for underlying causes is a preoccupation of natural as well as of moral philosophy, where the latter investigates *phenomena relating to moral beings*, and not exclusively morality. And while these two kinds of inquiry started to merge in the eighteenth century,[442] it will serve as a good guide to understanding Hume's method.

The Historical Pillar of Hume's Method

The empirical raw material from which Hume constructs a theory of human nature is descriptive and historical in character. Already in the Introduction of the *Treatise* he

suggests we should "glean up our experiments in this science from a cautious observation of human life",[443] which seems analogous with natural historical observation and description transposed into the sphere of moral phenomena. This *third-person, observer account* of human life is Hume's main methodological pillar. It is most clearly manifested in several passages of Book 2, discussing passions, in which he frequently refers to the common course of behaviour, typically in three contexts: either as a resource of phenomena to be accounted for in terms of the principles of human nature, or as a stock of confirming evidence supporting his explanatory constructs, or as seemingly contrary evidences to be explained away.

One should also add, that for Hume observation is not only a method of detached, third-person inquiry, but it also belongs to the *second-person, participant perspective* as is manifested in how we interact with one another. Observation is also the way in which we learn the regularities characteristic to human behaviour *in general;* it belongs to the course of common practice as well as to the proper foundation of philosophical reasoning.[444] Observation of human life is thus the point where inquiry and common life turn out to be continuous, the only difference being that the former is reflected, systematic and theory-oriented whereas the other is unreflected, sporadic and practice-oriented. This continuity is clearly illustrated when Hume discusses the nature of political obligation:[445] he supports his philosophical account with its accordance with the way common people think about these matters and act in such situations – even if they cannot articulate the principles on the basis of which they do so.

There is a special kind of observation, however, which plays a much more ambiguous methodological role in Hume: observation from the first-person perspective, i.e. *introspection.* On the one hand, he notes that reflecting on mental processes distorts them,[446] so self-observation, let alone contrived inner experience, cannot be appropriate ways of studying them, as they "wou'd so disturb the operation of my natural principles, as must render it impossible to form any just conclusion from the phænomenon".[447] And as Hume points out, for example, our idea of the will as a faculty of the mind derives from a "false sensation",[448] which suggests that introspection in this case can only mislead us if we are in the business of charting our "mental geography".[449] We are

frequently mistaken even about the contents of our own minds, sometimes taking impressions for ideas,[450] most significantly perhaps in the case of calm passions.[451]

On the other hand, the indirect declaration of the primacy of outward observation would not prevent him from relying on introspective arguments while arguing against, for example, the existence of an impression corresponding to the idea of a substantive self,[452] or of a necessary connection.[453] This is not very dissonant, though, because introspection does not play a crucial role in the positive phases of Hume's argument when he offers the solution of a problem at hand. Thus the examples I have just given are typical: either he uses introspective arguments in a negative way, i.e. pointing out the lack of a relevant impression, while discrediting alternatives, or just proclaims them misleading. Either way, introspective phenomenological evidence – how things seem or feel to be – can play at most a secondary role among the experiential resources available while constructing a science of man on Humean grounds: what introspection tells us should be vindicated by the independent means of philosophical reasoning and should not be accepted at face value as its starting point.

Should Hume's method of studying human nature rely on observation only, it would be hard to see, how it could deserve the label 'experimental' – if it is to entail anything more than 'experiential'. And indeed, the historical foundations of his method comprise two further empirical sources that may clarify the meaning of 'experimental' here. The first is *human history*:

> Its chief use is only to discover the constant and universal principles of human nature, by showing men in all varieties of circumstances and situations, and furnishing us with materials from which we may form our observations and become acquainted with the regular springs of human action and behaviour. These records of wars, intrigues, factions, and revolutions, are so many collections of experiments, by which the politician or moral philosopher fixes the principles of his science, in the same manner as the physician or natural philosopher becomes acquainted with the nature of plants, minerals, and other external objects, by the experiments which he forms concerning them. Nor are the earth, water, and other elements, examined by Aristotle, and Hippocrates,

> more like to those which at present lie under our observation than the men described by Polybius and Tacitus are to those who now govern the world.[454]

There are two interesting points to note about this passage in the present context. First, it treats historiography as providing data methodologically analogous with experiment in an important way: both would present its objects in various situations and furnish us with empirical material to theorise on. If our focus is on human nature, then it is history that provides us with the variation of circumstances in which the causal contribution of its functional components can be identified and studied.

Secondly, history establishes theoretical conclusions in very much the same way as natural history, meaning that moral and natural philosophies are methodologically continuous. In the light of the above passage it is easy to conceive of historians as reporting experiments made on human nature – and while there may be no experimenter, there are reported events that can be treated as experiments. Therefore, 'experiment' in this context may well be metaphorical, but what really matters is that historical records are *methodological* equivalents of detailed experimental histories.

Methodologically speaking, a moral philosopher can use historical works in very much the same way as a natural philosopher can rely on experimental histories produced by others. Newton, for example, selected from among Boyle's and Hooke's experimental findings to juxtapose them with available optical theories so as to gain new insights while working on his own theory of light. This is, as Kuhn says, "a non-Baconian use of Baconian experiment":[455] it proceeds not inductively but by contrasting empirical material with existing theories. But it is also a practice quite consistent with the use of history Hume proposes in the study of human nature, both in its use of second-hand experience and in its juxtaposition of experience with existing theories. What thus becomes crucial in each case is to identify the relevant and reliable parts of histories. This poses a common problem, again, to both moral and natural philosophies, one not to be discussed here, namely the role of testimony in cognition.[456]

As history "extends our experience to all past ages, and to the most distant nation; making them contribute as much to our improvement in wisdom, as if they had

actually lain under our observation" it adds to the pool of first-hand observations on human life so that "[a] man acquainted with history may, in some respect, be said to have lived from the beginning of the world, and to have been making continual additions to his stock of knowledge in every country".[457] Although history is thus continuous with direct observation, it still surpasses the philosophical importance of observing particular cases, because it offers richer and more conclusive empirical material for philosophical reasoning.

As Hume sees it, history allows for observing how some general transformation in the circumstances would exert influence on the thinking and behaviour of entire populations, and this is what makes politics as a science possible. By reporting large-scale transformations historiography presents several cases of a cause followed by an effect, and thus it provides a much broader and more effective basis for inductive generalisations than everyday experience or the observation of particular instances. The latter ones are much more likely to deviate from general regularities due to the influence of idiosyncratic circumstances,[458] and they are thus less reliable sources for inferring the principles of human nature.

There are, however, important and obvious dissimilarities between historical events and experiments. As Hume sees clearly, it is impossible in the field of moral philosophy to conduct experiments "purposely, with premeditation".[459] Since the seventeenth century, 'experimental' partly meant, as Kuhn has Bacon say, "twisting the lion's tail", "torturing" nature,[460] producing situations that would not exist in nature without human intervention, that is, it increasingly meant an artificial step in knowledge production. As Hume indicates, this kind of experiment, i.e. contrived experience, has only limited availability in the science of man. Social experiments, comparable to those of historical events, are impracticable, and one could also argue that the relevant experiments would distort the principles of human nature as does introspection. And this indicates a limitation on an experimental science of human nature. Without contrived experience asking specific questions about the reliability of a theory of human nature is hardly possible.

One might think that denying the possibility of manipulative intervention with the hope of cognitive success is devastating for Hume's attempt at finding a proper

experimental footing for his project, so 'experimental' for Hume "meant no more and no less than an appeal to experience in support of his claims".[461] As contrived experiments cannot play a role, it is impossible to design a Newtonian *experimentum crucis* to test alternative propositions as well as to follow the Boylean way of experimental fact-collecting for the purposes of subsequent philosophical processing. What seems to remain is only a very general and unspecific sense of 'experimental' meaning something akin to Baconian natural, but not experimental, history: i.e. fact-collecting and systematic observation.

But, *pace* Wood,[462] this Baconian stance does not inform Hume's actual practice. At the time of writing the *Treatise,* i.e. much before he devoted himself to writing his history of England, he had had substantial knowledge of history,[463] yet he never proceeds by listing "experiments", taken from history or contemporary observation, in order to infer on this basis inductively his theoretical insights – something one would expect from a faithful Baconian. Instead, he is using both history and observation as sources of *experimenta crucis*: showing the explanatory strength and plausibility of his theory by enabling phenomena to pick out which among alternative explanations hold true. An explicit example is his discussion of why love is always followed by benevolence and hatred by anger when he contrasts two possible hypotheses and decides between them on the basis of observation.[464] Instead of accumulating several examples Hume carefully chooses cases he considers crucial in a given context and highlights features that make them supportive of his account. It is thus not the way in which empirical material for theory building is gained, but the *methodological role* it plays that makes this material experimental.

There is another possible source of "experiments" which Hume does not make use of. *Travel writing* is already important for Locke's historical explorations of human understanding,[465] and in the seventeenth and eighteenth centuries this genre is generally conceived as a rich collection of "human experiments". At the end of the period Edmund Burke sees its importance so great that for him it replaces history in the science of man because it can reveal "the great map of mankind".[466]

One could thus wonder why Hume does not ascribe it a weight at least similar to that of history. One reason is given in an essay in which he argues that the differences

among various nations are to be explained *exclusively by moral causes*, i.e. in terms of the customs, institutions, morality and system of rules etc. prevailing in a given group, and denies, *pace* Montesquieu, that physical causes like climate, available food, etc. could influence these.[467]

Another reason may be that travel writing can grasp neither the development of moral causes diachronically, nor human nature in the context of this development. The interaction of moral causes can be revealed only diachronically, so travel writing is practically useless as it offers a description of the present state of affairs, not the process by which it has emerged. Therefore its capacity to serve as an experimental basis for philosophical inquiry is even more limited than that of history.

Finally, there is a marginal sense in which Hume's project could be made out to be properly experimental. Its relevance is marginal because it would not provide him with a sufficiently broad empirical basis for his project. Yet, it is quite possible to construe at least some of Hume's thought experiments not as appeals to our intuitions but as real psychological experiments. For example, the famous "missing shade of blue" thought experiment could, in principle, be turned into a real one.[468] The question whether it is possible to imagine a particular shade of blue that was never before encountered and is missing from a gradually descending colour scale from light blue to dark blue can find an experimental answer.

We could find out if Hume's scenario is true, by presenting previously blind or colour-blind people with this scale. If they consistently, successfully choose from among a range of individual shades the one that fitted into the scale, one would be in a position to tell whether the people in question had construed the idea of the missing shade or not. The inkspot experiment is perhaps even more easily practicable, and given Hume's commitment that ideas can arise only from sense impressions,[469] it could provide real experimental support for the conclusion that we cannot have an idea of infinite divisibility, and so we cannot ascribe it meaningfully to anything. The interpretation of these experiments may, of course, be different from Hume's, but the point is that a part of the psychological foundations of his science of man could be turned into experimental in a preconceived, premeditated, contrived, etc., sense of the word.

The Philosophical Pillar of Hume's Method

In the modern sense, as we have just seen, the prospects of providing an experimental basis for Hume's science of man is fairly limited, as "experiments" here cannot arise from an intervention into the normal course of human nature, which would render the findings useless anyway. However, Hume is much less concerned with how empirical material is to be gained than with how it is to be processed. It is thus not primarily the meaning of 'experimental' that should be clarified in its own right, but rather the entire phrase, *experimental method of reasoning*, as it reads in the subtitle of the *Treatise*.

It is quite clear from some of Hume's passages that his method is intended to be contrasted with *a priori* and geometrical methods – for example, the one which Hobbes had found appropriate for his civil philosophy,[470] or Descartes's method of searching for clear and distinct principles in order to construct theories in an intuitive and deductive way.[471] In the light of the subject's nature Hume finds this kind of method wanting in comparison with an experimental approach:

> we can only expect success, by following the experimental method, and deducing general maxims from a comparison of particular instances. The other scientifical method, where a general abstract principle is first established, and is afterwards branched out into a variety of inferences and conclusions, may be more perfect in itself, but suits less the imperfection of human nature, and is a common source of illusion and mistake in this as well as in other subjects. Men are now cured of their passion for hypotheses and systems in natural philosophy, and will hearken to no arguments but those which are derived from experience. It is full time they should attempt a like reformation in all moral disquisitions; and reject every system of ethics, however subtle or ingenious, which is not founded on fact and observation.[472]

For Hume a demonstrative ideal of inquiry, which proceeds in an *a priori* manner from allegedly clear definitions or indubitable propositions, is of no use if one is in the

business of an empirically founded science of man.[473] It can be useful only in constructing explanations once we have knowledge of the principles of human nature, but such knowledge can be gained only from experience, and not in an *a priori* way.

Hume's attitude is consonant with the rejection of "speculative" in favour of "experimental philosophy" which, as Thomas Sprat explains while writing the history of the Royal Society,[474] was the innovation setting the new philosophy apart from previous approaches to nature. And it is indeed the perception of the inferiority of speculative approaches that motivates Hume in undertaking the enterprise of founding moral philosophy on an experimental basis. The broadest outlines of his methodological intentions are made clear in an early letter of March 1734:

> I found that the moral Philosophy transmitted to us by Antiquity, labour'd much under the same Inconvenience that has been found in their natural Philosophy, of being entirely Hypothetical, & depending more upon Invention than Experience. Every one consulted his Fancy in erecting Schemes of Virtue & of Happiness, without regarding human Nature, upon which every moral Conclusion must depend. This therefore I resolved to make my principal Study, & the Source from which I wou'd derive every Truth in Criticism as well as Morality.[475]

For Hume the experimental method of reasoning aims at *revealing the underlying causes* of phenomena to explain the regularities of both nature and human nature in terms of principles knowable from a human point of view. And the project is to reveal from observable phenomena these explanatory principles that are themselves not observable, and to resolve them into more and more general ones:

> 'tis at least worth while to try if the science of *man* will not admit of the same accuracy which several parts of natural philosophy are found susceptible of. There seems to be all reason in the world to imagine that it may be carried to the greatest degree of exactness. If, in examining several phænomena, we find that

> they resolve themselves into one common principle, and can trace this principle into another, we shall at last arrive at those few principles, on which all the rest depend. And tho' we can never arrive at the ultimate principles, 'tis a satisfaction to go as far as our faculties will allow us.[476]

So while the inquiry may not result in knowledge of some human essence, it can satisfy our curiosity, and it can be useful as well. The science of man, like any other science "is to teach us, how to control and regulate future events by their causes",[477] so we can apply this knowledge in the interest of society.[478] This knowledge is thus both *instrumental and subjectively satisfactory*, but it is not knowledge of the ultimate first principles of human nature.

"All the logic" he follows in this inquiry is summarised as a set of rules to regulate the explorations of causes, rules that are equally uniform for both natural and moral philosophy.[479] Finding analogies between different instances gives the chance of explaining causes and reducing them to "more general principles".[480] Hume also clarifies how to use the experimental basis in analogical reasoning so as to arrive at the principles of human nature and the explanation of human phenomena. The method here is a kind of *analysis and synthesis:*

> By means of this guide [i.e. historical and everyday observations of human behaviour], we mount up to the knowledge of men's inclinations and motives, from their actions, expressions, and even gestures; and again descend to the interpretation of their actions from our knowledge of their motives and inclinations. The general observations treasured up by a course of experience, give us the clue of human nature, and teach us to unravel all its intricacies.[481]

This method of exploring the understanding by the "exact analysis of its powers and capacity" is not an artificial method:[482] it is continuous with the everyday way of finding out what is on someone else's mind: "No passion of another discovers itself immediately to the mind. We are only sensible of its causes or effects. From *these* we

infer the passion: And consequently *these* give rise to our sympathy."[483]

The difference between philosophical inquiry and everyday mind-reading is that in the latter case we infer the *contents* of the other's mind, while in the former we aim at revealing the general causal *principles* underlying these phenomena. While doing philosophy we just give up the participant's position for the observer's, and start searching for regularities instead of occurent mental states, but our methods of so doing are similar in both cases.

Overlooking the centrality of this descending and ascending method in Hume can lead to the unjust allegation that there is a general instability in his thought resulting from the unclear relation between the science of man and history: the principles of the former sometimes seem to follow from historical observations, sometimes they serve as the explanation of historical events.[484] This is, however, not due to any intrinsic instability in Hume's thought, but results from the methodological status of the principles themselves. We gain them from phenomena in the phase of analysis by comparative means, but in the phase of synthesis we use them for the purposes of explanation. The outlook in the two phases are opposite, in the first it turns from phenomena to principles, in the second from principles to phenomena. The epistemic aims are thus different: by analysis we aim at lawlike *principles*, by synthesis we aim at the *explanation* of phenomena by deriving them from these principles.

The methodological core idea is now visible. Human phenomena are collected from history and observation, and then compared; if analogies and similarities are found, they are ascribed to some principle of human nature that are also compared, grouped and resolved into more general ones. Once phenomena are analysed into their causal springs, the resulting principles can be construed for the purposes of explanation thereby satisfying our curiosity and facilitating the improvement of society – without the possibility of ultimate knowledge of human essence. As the principles Hume looks for lay behind observable phenomena, there is inevitably a degree of uncertainty and fallibility in the results that this inquiry may deliver:

> we must distinguish exactly betwixt the phænomenon itself, and the causes, which I shall assign for it; and must not imagine from any uncertainty in the latter, that the former is also uncertain. The phænomenon may be real, tho' my explication be chimerical. The falsehood of the one is no consequence of that of the other.[485]

Due to this fallibility, the ingredients of human nature can be supposed to be fundamentally uniform only in a methodological and fallible as opposed to some essentialist sense – just like the fundamental ingredients of the world are supposed to be unchanged in our natural inquires.[486] This commitment ensures that it is sensible to look for the components of this fundamental structure or regularity in human nature, a commitment similar to that of the natural philosopher. This is thus a methodological *sine qua non* and not, *pace* Smith,[487] an *a priori* category of a universal human nature in the substantive sense of a human essence. What Hume's project presupposes is not that human beings are the same *sans phrase,* only that there is a descriptive, natural historical category, constituted on the basis of the similarities of its members which are composed of qualitatively similar ingredients accessible by comparative methods. And this is what specifies the cognitive benefit to be expected from Hume's science of man: the "delineation of the distinct parts and powers of the mind".[488]

There are also less stable principles playing an important role here:

> I must distinguish in the imagination betwixt the principles which are permanent, irresistible and universal; such as the customary transition from causes to effects, and from effects to causes: And the principles, which are changeable, weak, and irregular; ... The former are the foundation of all our thoughts and actions, so that upon their removal human nature must immediately perish and go to ruin.[489]

Some principles of imagination are then constitutive of human nature, but some others are just contingent on culture, history or can even be idiosyncrasies, and can end up in

superstitions or philosophical chimeras like presupposing 'substance' as the bearer of properties in scholastic metaphysics.

So while the universal principles provide the general framework, on their basis various circumstances inculcate further ones. This explains why certain virtues, like e.g. courage, are evaluated differently in different historical periods,[490] and also why a creature without sympathy, however contingent its degree and direction may be, would count as a "monster" not a "man".[491] It is thus apt to say that while the framework is universal, its content is to a high degree contingent. This amounts to saying that Hume's account has both universalistic and relativistic elements in it, and it sheds a sharp light on the methodological role history plays: it is only from a diachronical perspective, through the study of change, that universal and contingent features of human nature can be separated.

Hume's Project in Context

I think the overall lesson is clear. The inquiry Hume pursues is primarily *qualitative:* it provides a way of identifying the causal components contributing to the production of human phenomena, by outlining "the accurate anatomy of human nature".[492] As it were, Hume offers a chemical analysis of compound human nature into its ingredients. These are identified as principles with distinctive causal contribution, and human phenomena are considered to be the result of their dynamic interaction. They provide the universal *structure* of human nature in terms of its *functional* components characterised by their self-activity, by the distinctive way they operate on ideas and impression. It is thus more than a mere figure of speech when Hume says he explores the anatomy and physiology of human nature – it is a central and constitutive metaphor of his entire project.[493]

The analysis of human phenomena results in various motives of human behaviour and internal functioning, which are then subsumed under a variety of principles ascribed to faculties of the mind – like that of sympathy, imagination, reason etc. The interaction of these principles are frequently envisaged as the interaction of

qualitatively different principles, "as in certain chemical preparations, where the mixture of two clear and transparent liquids produces a third, which is opaque and colour'd".[494] Rarely are they seen as qualitatively uniform Newtonian external forces, an artificial kind with specific direction and quantity. The Humean science of human nature consists in the separation and identification of these principles and the examination of their interactions – in qualitative investigations that is, for which the method of analysis and synthesis is the ideal framework.

With his qualitative project Hume does not stand alone on the eighteenth-century intellectual landscape. As Robert Schofield points out,[495] an important transformation in British intellectual climate took place around 1740, marking, among other developments, the emergence of a materialistic-vitalistic tendency in natural inquiry, gradually replacing the Newtonian dynamic mechanism. As a result, a new style of inquiry and explanation became common: "the mathematical analysis of motions to find forces" gave way to the exploration of "different qualities from experimentally observed characteristics".[496]

The new style of explanation proceeded in terms of qualitatively different substances, instead of explaining phenomena in a mechanist way, in terms of the interaction of qualitatively homogenous particles. Newton's aetherial speculations rehabilitated active principles, and weakened the mechanist orthodoxy of inertia being an essential property of matter. This process had been initiated by the *Opticks*, and especially its Queries, and it had a very strong presence at Scottish universities throughout the century. Representatives of it include William Cullen, Joseph Black, James Hutton, and John Gregory.[497]

These tendencies toward new styles of explanation and inquiry were not peculiarly British phenomena. Discontent with mechanical philosophies of nature was widespread in eighteenth-century Europe, particularly in France and Germany. As Peter Hanns Reill shows, there was a vitalistic movement in the Enlightenment which responded to problems, particularly those of living matter, that mathematized mechanical theories could not solve.[498] This led to a revival of natural history, most importantly represented by Buffon – and in the domain of moral phenomena, by the Scottish Enlightenment.[499]

Its methods were not based on mathematics, but "on the principles of comparison, resemblance, affinity, analogical reasoning". Its explanations in terms of "inner, active forces as central agents in nature" replaced the mechanists' view of external forces acting on inert matter.[500] It is important to note, however, that despite the emphasis on Baconian roots, natural history now aspired to more than Bacon had originally envisaged. It aimed not only at collecting, describing and classifying phenomena for future philosophical processing, but made instant explanatory use of the insights gained by historical methods. The methods of natural philosophy and natural history started to merge here.[501]

This is the context, I believe, within which sense can be made of Hume's method. Recently, Andrew Cunningham suggested that a vitalistic outlook is characteristic of Hume's theory of the mind whose essential feature is self-activity.[502] I think it is fundamentally on the right track and is in accordance with Hume's experimental method: it is qualitatively oriented, and as such it is ideal for revealing the distinctive contribution various faculties make. They exert *active* influence by transforming the passive material of impressions and ideas: sympathy turns ideas into impressions thus enabling us to feel what others feel;[503] upon experiencing one event regularly following another habit provides us with a secondary impression as the basis of our idea of necessary connection,[504] and so on. Human nature is composed of functional components characterised by their active contribution in terms of predominantly non-mechanical principles. The science of man is the enterprise of charting them and their interactions.

VII. The Anatomy and Physiology of Mind: Hume's Vitalistic Account

In this chapter I am going to argue further that the theory of human nature that Hume elaborates in his *Treatise* is a qualitatively oriented *and* a predominantly vitalistic account of human nature – just as one would expect on the basis of his experimental method. As such it is congruent *in its outlook and conceptual resources* with the philosophical chemistry and vitalistic physiology that were the prominent orientations of natural inquiry in the Scottish Enlightenment, and as such it can be placed in the broader European context of Enlightenment vitalism.[505]

Replacing the *Principia*'s ideal of couching explanations in terms of external immaterial forces acting on homogeneous inert matter, this new vitalism rehabilitated appeal to qualitative differences and active material principles while explaining observable phenomena.[506] During the course of the eighteenth century, this outlook became dominant in those fields of natural inquiry where the mechanical approach failed to deliver satisfactory explanations – especially in exploring the qualitative differences and interactions between chemical substances, the nature of qualitative change, and in tracking the phenomena of active, living matter. And this is also characteristic to Hume's theory of human nature.

Chemical investigations in eighteenth-century Scotland were largely driven by their potential use in medical practice. Although the first professors of the Edinburgh medical school were educated at Leiden, and they imported to Scotland a Boerhaavean mechanistic approach, Edinburgh quickly turned into a centre of *vitalistic physiology* and, from the second third of the century, offered an alternative to Boerhaavean medical orthodoxy. Edinburgh professors like William Porterfield and Robert Whytt emphasized the *active* influence the mind exerts on physiological processes.[507] Porterfield developed a vitalistic account of binocular motions that enable us to judge the distance of objects, and then extended it to other bodily motions too. In his view it is custom and habit, arising from a rational and voluntary decision, that stabilize the

processes as a result of which we cannot but constantly focus our eyes. This habit thus becomes a law that the mind imposes on itself because of the intrinsic utility it has in judging distance.

As his student notes testify, Whytt attended the classes of George Young, an adjunct teacher at Edinburgh medical school, who taught him to be sceptical about mechanical explanations in physiological matters because, as he saw it, presupposing a hidden mechanism behind muscular motion is empirically ungrounded. Whytt, similarly explained bodily responses as arising from "an active sentient principle" of which we may lack sufficient theoretical knowledge, but we can know its workings from the direct experience of *how it feels*. Although its workings are frequently unconscious, it is due to us being habituated to them and to them being gentle themselves.

Gradually distancing himself from Porterfield's theory, with the sentient principle Whytt offered a unified account of bodily processes replacing rationality with feeling as its basic principle. Whytt's was a picture of various parts of the body communicating via the nervous system and responding to stimuli involuntarily and unconsciously. Although they disagreed in several respects, Porterfield and Whytt agreed on at least one point which may be called their common vitalistic stance: namely that living organisms are active in the sense that they respond with more energy than contained in the stimuli, so they cannot be studied along the same lines as dead matter. In the explanation of living matter the perspective of mechanical aggregation must give way to that of animal economy.

In Scotland a vitalistic vocabulary extended its influence beyond the disciplinary boundaries of medical investigations into the realm of the moral sciences. There are traces of an important influence of a vitalistic outlook and language in Adam Smith's economic theory. It is centred on the idea of a natural balance in the economic body governing itself with its own internal active forces. Smith depicts this body as a living organism whose activities are conceived as interconnected parts of a larger whole whose balance is maintained by "some unknown principle of preservation" explicitly compared to the unknown, vital "principle of animal life".[508] Adam Ferguson also emphasizes the explanatory deficiencies of analogies drawn between the inanimate material world and society on the basis that the latter is composed of "living and active members". For him,

adopting the perspective of mechanical theories of inert matter in moral philosophy can yield only overlooking the dynamic nature of social phenomena.[509]

As I suggest in this chapter, Hume's theory of human nature is also informed by similar vitalistic tendencies and thus it can be placed in this context. As a student at Edinburgh University, Hume took classes in natural philosophy and later he quite probably read medical works by Bernard Mandeville and George Cheyne that introduced him to contemporary physiological ideas.[510] While writing up the *Treatise* (1735-37) he was working in Reims, using Noël-Antoine Pluche's library, and in La Flèche, the leading Jesuit centre of experimental physics at that time. Later he was active in the Philosophical Society of Edinburgh, for a while as its secretary, even editing some of its publications in natural philosophy; and he had friends like William Cullen and Joseph Black.[511] Throughout his life he was surrounded by ideas of natural philosophy, and his work was not left untouched by them.

In this chapter I intend to argue further that it is indeed close to the actual spirit of Hume's work to read it against the background of the metaphor of a qualitatively and vitalistically oriented anatomy of the human mind, which is built upon the foundations of its physiology. It is important to emphasize that talking about Hume's anatomy and physiology of mind is metaphorical: it signals the transmission of a language of natural phenomena to the moral domain.

Hume sees moral philosophy, that is, the study of moral beings *qua* moral beings, as an independent enterprise: while he certainly thought that natural philosophy could serve as a model and inspiration for moral philosophy, and that it could provide the proper methods as well, still moral philosophy represents an autonomous enterprise for him in which phenomena characteristic to human beings *qua* moral beings could be studied. This is why Hume takes pain to demarcate his inquiries from anatomy and physiology as disciplines of natural philosophy while repeatedly proclaiming himself explicitly an anatomist of human nature.[512]

Hume's Qualitative Project

Let me begin with a quotation which I think aptly represents the consensus of most commentators, as well as the public image of Hume:

> On Hume's analysis, the mind is a compound entity, but it is not composed of independent faculties, as in the scholastic account. The components of the mind are perceptions, unified by relations of resemblance, causation, and the operation of sympathy.'[513]

If this view of the Humean mind as nothing but a *bundle of perceptions* is right, then it would make little sense to talk about anatomy here.

But there is something intrinsically suspicious about this and similar quotations: what is sympathy if not a faculty that can operate on some perceptions? And what is the ability to recognize resemblances if it is not a faculty? Hume is very much aware that resemblance does not supervene exclusively on the intrinsic properties of perceptions, because if this was the case then some philosophical reflection would reveal that everything resembles everything, whereby resemblance would lose all its explanatory power as a principle of association.[514] Yet, as a matter of fact, resemblance as a natural relation holds only between *some* perceptions. Therefore it seems quite natural to suppose that there is some faculty that is responsible for picking out some resemblances as salient from among the infinitely many possible ones, thus making them available as the basis of a principle of association. And there is one, indeed: it is memory that is effective in "producing the relation of resemblance among the perceptions" – we remember past impressions as being similar.[515]

Hume sees his own identity as that of an "anatomist of the human mind". This metaphor is central throughout the *Treatise* and later in the *Enquiry concerning Human Understanding*. It emerges in a 1739 letter to Hutcheson in a famous comparison with the painter of human nature:

> There are different ways of examining the Mind as well as the Body. One may consider it either as an Anatomist or as a Painter; either to discover its most secret Springs & Principles or to describe the Grace & Beauty of its Actions. I imagine it impossible to conjoin these two Views. Where you pull off the Skin, & display all the minute Parts, there appears something trivial, even in the noblest Attitudes & most vigorous Actions: Nor can you ever render the Object graceful or engaging but by clothing the Parts again with Skin & Flesh, & presenting only their bare Outside. An Anatomist, however, can give very good Advice to a Painter or Statuary: And in like manner, I am persuaded, that a Metaphysician may be very helpful to a Moralist; tho' I cannot easily conceive these two Characters united in the same Work.[516]

This is consonant with the view Hume expounds in the Introduction to the *Treatise*, namely, that the science of human nature is the foundation of all further knowledge, it is the first philosophy as it were, on which, to some degree, all the branches of knowledge depend, "since they lie under the cognizance of men, and are judged of by their powers and faculties."[517] Our knowledge is *human* knowledge through and through: we cannot know its limits and extent without exploring first the kind of knowledge we are capable of having at all. But Hume's anatomy of the mind offers more than that: a descriptive-explanatory account of both human knowledge *and* action – which is contrasted with the moralists' normative enterprise.

The task of the anatomist of human mind begins where that of the anatomist, physiologist and natural philosopher ends, and it is continuous with theirs. And *vice versa*: it is their task to submit explanations where the study of human nature cannot go further as in the case of primary impressions which, if looked at from the perspective of moral philosophy, arise "in the soul originally, from unknown causes" and whose proper study is anatomy and natural philosophy.[518]

The task of the moral philosopher starts from the most basic, one could say phenomenological level directly experienced by, and relevant to the understanding of

moral beings, that is on the level of perceptions. On Hume's account, there are two kinds of perceptions in the mind which are the building blocks of all human cognition: impressions and ideas, both can be simple and complex. Impressions are the matter of actual experience, and they are either provided by the senses or by reflection which produces passions. Ideas are representations of these impressions, most aptly seen as mental images or concepts.

As he frequently emphasizes, the difference between these two kinds of sensation consists in the *force and vivacity* with which they present themselves: simple ideas are fainter copies of simple impressions. Force and vivacity come in degrees. Most commentators take this difference in degree as being the only difference that distinguishes impressions from ideas; thus it is also implied that there are no qualitative differences between them. But this view can be challenged by a rarely quoted passage from the *Treatise*:

> Ideas may be compar'd to the extension and solidity of matter, and impressions, especially reflective ones, to colours, tastes smells and other sensible qualities. Ideas never admit of a total union, but are endow'd with a kind of impenetrability, by which they exclude each other, and are capable of forming a compound by their conjunction, not by their mixture. On the other hand, impressions and passions are susceptible of an entire union and like colours, may be blended so perfectly together, that each of them may lose itself, and contribute only to vary that uniform impression, which arises from the whole. Some of the most curious phænomena of the human mind are deriv'd from this property of the passions.[519]

One could perhaps say that here Hume just echoes the then commonplace Cartesian dictum that passions are clear, i.e. vivid perceptions, but they are not distinct. But one should not overlook the language in which the distinction is drawn: the passage clearly suggests that there are, indeed, *qualitative differences* between impressions and ideas; their interactions follow different principles. On the one hand, ideas are characterized

by mechanical properties that are preserved in their interactions: they are and always remain conceptual atoms. This also means that the formation of a complex idea is a reversible process: its building blocks can be combined and recombined in various ways without loosing their identity, and this property makes possible the analysis of complex ideas at all. Impressions, and especially passions, on the other hand, are susceptible of qualitative transformations, and they are characterized by properties and interactions that are not explained in a corpuscular way.

Hume's famous "missing shade of blue" thought experiment shows that this difference has real philosophical import, and it is not just an illusion arising from a fanciful metaphorical language.[520] Here Hume discusses a puzzling exception to his general rule that simple ideas are copies of previous simple impressions. He claims that if we are presented with a colour scale gradually descending from light blue to dark blue with one particular shade of blue missing in it somewhere, then we *can* imagine the idea of that missing shade without having been encountered it before in the form of an impression. While admitting this case as an exception to the general authority of his copy claim, Hume dismisses it as a merely peripheral one not worthy of serious consideration.

It is important to note that this problem would not even emerge if ideas and impressions were not qualitatively different. If ideas were not characterized by mechanical properties, but they were presented in a manner like impressions, then it would be quite natural to say that it is of course possible to produce the idea of the missing shade: by mixing the ideas of the two neighbouring shades one could easily imagine the missing shade itself. But one cannot do this, as ideas, imagined as conceptual atoms, cannot interact this way.

And this introduces an important lesson for the anatomy project. If ideas are copies of impression, then there must be a principle of human nature causally responsible for copying. Furthermore, if ideas and impressions are qualitatively different, then this principle must exert an active, *transformative influence* on the impressions provided by the senses, and reflection must do the same when producing passions from ideas. And if it is possible, even if only in exceptional cases, to produce an idea without a preceding impression, then again, there must be some principle

accounting for that too. The principles themselves are also *qualitatively distinguished* by the kind of activity they exert on various perceptions, and also by the kind of perception they exert it on – as the extract quoted concerning impressions and ideas suggests. Specific principles apply to different kinds of impression, deriving either from the senses or reflection, and also to ideas depending on their content. The task is to explore qualitatively different principles identified through their distinctive causal contribution to the constitution of human nature.

Hume's Faculty Psychology

While there are indeed passages where Hume says things like "they are successive perceptions only, that constitute the mind",[521] it would still miss the point of Hume's entire project to finish reading just there. While it is true that for Hume the *contents* of the mind consist entirely of perceptions, yet his aim, as he frequently emphasizes, is to find the *principles* that describe the causal framework of how those perceptions follow one another. It is therefore misleading to say that there is nothing more to the Humean mind than its contents: one can reveal systematic interconnections among its contents, establish them as principles whose interconnections can be revealed as well. And these findings can be used for the purposes of explanation of why perceptions follow one another in the order they do. Without some commitment to the existence and stability of such principles Hume's project would lose its point.

The epistemic status of these principles of human nature is similar to those of natural philosophy: we are presented with human phenomena and the philosopher's task is to explain them by reference to the principles productive of them. These principles are not perceived directly, and we have no impressions of them. Instead, they are revealed by empirical reasoning and thus our knowledge of them is fallible: only the contents of the mind are given, while the principles applied in their explanation are theoretical constructs.[522] Therefore they do not presume a robust ontological

commitment on Hume's part, only a tentative or instrumental one, to the extent that they can be used for the purposes of useful and satisfactory explanations.[523]

These principles are not scattered regularities, but they are indeed *structured*, and in this sense the universal anatomy of the human mind is analogous with the structure of the body.[524] As some of these principles, just like certain organs of the human body, interact more closely they can be conveniently subsumed under various *faculties*, so Hume is justified in talking freely, for example, about the universal principles of imagination, of sympathy,[525] as well as of other faculties, their limits and imperfections. Talk about faculties is abundant throughout the text; sometimes they are referred to straightforwardly as the "organs of the human mind" as in the case of the faculty which is responsible for producing passions, i.e. reflection.[526]

As I have already introduced Hume's method in greater detail, the Humean recipe for charting the anatomy of human mind seems to be this:[527] compare phenomena, find analogies between them, ascribe them to principles, resolve them into more general ones if possible, and find their place in the structure of their interaction in producing the phenomena. This is a predominantly *reductive stance* that seeks to subsume a variety of phenomena under a handful of principles, and it makes Hume's theory immune to charges of emptiness like the one Locke advanced earlier:

> we may as properly say, that 'tis the singing *Faculty* sings, and the dancing *Faculty* dances; as that the *Will* chuses, or that the Understanding conceives; or, as is usual that the *Will* directs the Understanding, or the Understanding obeys, or obeys not the *Will*: It being altogether as proper and intelligible to say, that the power of Speaking directs the power of Singing, or the power of Singing obeys or disobeys the power of Speaking.[528]

Surely, this passage can be used only as a malicious caricature of Hume's project. Subsuming various phenomena under qualitatively different causal principles can hardly be seen as offering empirically empty tautologies.

This method results in a set of principles belonging to various faculties as the constituent parts of a compound human nature. The list of faculties includes sensation, memory, imagination, reason, judgement, reflection, and sympathy. *Will* is conspicuously missing from the list. But on second thought it is not surprising: given that for Hume will is not a faculty but "the internal impression we feel and are conscious of, when we knowingly give rise to any new motion of our body, or new perception of our mind",[529] and as such it is explicitly compared to passions like pride and humility, that are subject to the principles of reflection. Conscious will is just a "false sensation",[530] not a faculty that could play a directive role in action.

And there is a general lesson here: contrary to the dominant view of scholastic and several early modern authors where reason is normatively prescribed the role of a supreme faculty that should direct action,[531] there is *no comparable hierarchy of faculties* in Hume. Although he notoriously claims that "[r]eason is, and ought only to be the slave of the passions",[532] and it might sound as if reflection, as the faculty responsible for the production of passions, should stand at the top. Yet passions themselves are part of a causal structure of perceptions governed by the principles of various faculties, e.g. "custom and repetition" which have a great effect "both to encrease and diminish our passions".[533] So, instead of an "upside-down rationalist" hierarchical organization, Humean human nature is characterized by a continuous interplay of various faculties without a dominating centre or director.

Not independently of the lack of hierarchy, Humean faculties are *not distinct modules*, but they interfuse or penetrate one another and they have principles in common. Due to its passivity, the best plausible candidate for a modular faculty is external perception which merely collects impressions. According to Hume's official definition perception is "a mere passive admission of the impressions thro' the organs of sensation".[534] Even though it is passive, "[t]hose who are acquainted with the metaphysical part of optics ... know how we transfer the judgements and conclusions of the understanding to the senses."[535] Hume here seems to imply a meaning of metaphysics, not uncommon in the period, which bears on the study of the mind and its operations, and in Scotland at that time it was frequently conceived as standing in close relation to physiology.

So, beside Berkeley and Malebranche,[536] Hume's insight converges to contemporary physiological discourse too – especially to Porterfield's theory of binocular motions, first published in two parts in 1735 and 1737,[537] according to which it is due to custom and habit that we can focus our eyes and thereby infer the distance of the objects presented in the visual image.[538] However, it is important to note that there are divergences between the concepts of "custom and habit" in Porterfield and Hume. For Porterfield the emergence of habit is voluntary on the mind's part, and it consists in the mind binding itself by an intrinsically useful law, which is therefore not innate, but "morally necessary".[539] For Hume custom and habit, far from being voluntary, are the most fundamental principles of human nature, which can be revealed in the background of several mental processes. Its operation does not depend on, and certainly not supervised by the mind, as Porterfield claims, rather it is a principle constitutive of the mind itself. Porterfield's notions of custom and habit are all too voluntaristic and rationalistic by Hume's standards.

Not only perception, but also the faculties in general lack clear boundaries in Hume. Association by resemblance is a common principle of both understanding and reflection, and imagination has a great influence on the passions.[540] Due to their common principles the activity of various faculties combines in a dynamic and interactive way in producing various perceptions and actions. These two features, i.e. the *lack of hierarchy and modularity* of faculties, are the distinctive marks of Hume's theory of the human mind, and not, what is commonly held, that he as an associationist "reduced the powers of the mind to one, the ability to receive impressions" and explained all phenomena of the mind by appeal to laws of association.[541] Hume's mind does not work that way.

Despite not being modular, faculties can be characterized functionally – more precisely, they can be characterized *exclusively functionally*, only by the characteristic activity they exert on specific kinds of perception, as well as by their various influences on each other. The focus on functions is the only appropriate one for "a just and *philosophical* way of thinking" as contrasted with everyday thinking. In our philosophical – that is, by contemporary standards, explanatory – enterprises

> the distinction which we sometimes make betwixt a *power* and the *exercise* of it, is entirely frivolous, and [...] neither man nor any other being ought ever to be thought possest of any ability, unless it be exerted and put in action.[542]

Accordingly, the faculties of the mind can be studied and described only in terms of their actual and observed functioning, i.e. through the exploration of the processes to which they contribute.

While reconstructing Hume's views on morality, Rachel Cohon draws a detailed picture of how the various faculties of reason, sympathy and moral sense work and interact in his account. She characterizes them as *processes* in the mind, and suggests that Hume's talk about faculties should be understood this way.[543] This is perfectly legitimate, as faculties within the Humean framework cannot be identified independently of the role they play. However, we should not replace talk about faculties with that of processes just because they are only functionally identifiable. Hume's project aspires to more than just a natural history of the mind: it is a search for the (causal) principles of human nature, which he needs for the purposes of explanation of why perceptions follow one another in the order they do and how actions spring from them. It is thus not merely a project of describing and classifying processes; rather it is to explore the causal potentials the human mind exhibits via exploring and classifying its characteristic activities. Thus allowing for functionally identified faculties exerting active influence on perceptions seems perfectly in order, and fits the textual evidence better.

As Andrew Cunningham has argued, Hume's view of cognitive activities has a *vitalistic* flavour: it is the mind's internal need for activity that motivates truth-seeking – truth in itself is not enough of a motivation.[544] I suggest that something similar is true about various faculties in particular: the principles Hume establishes describe the characteristic interactions of faculties, the functional structure of human nature whose elements are causally responsible for processing perceptions relevant to them. This process is not typically mechanical, cannot be understood in terms of impressions causing ideas and *vice versa*.

As we have seen above, ideas are not just fainter impressions but they constitute a different kind of perception, the two kinds of perception have different properties and enter into different interactions. Thus the faculty responsible for copying impressions into ideas must make an *active and qualitative* contribution. So does sympathy: when we form an idea of a passion that someone else is experiencing, it is the operation of sympathy that "converts" this idea into an impression thereby making it possible to feel what the other feels.[545] Were it not for the active and selective influence of sympathy on *some* ideas, but for a mechanical-causal relation between ideas and impressions, it would then be impossible to explain why only ideas about others' passions are turned into the corresponding impressions.

And the case is again similar with imagination, too. We cannot have an impression of a cause; we can have only a repetition of similar cases. But we cannot experience anything in a thousand cases which is not there in a single one. Yet, prompted by several cases, memory, the recognition of resemblances, and habit give rise to "a determination of the mind", and the way it feels is just the new impression whose copy is the idea of necessary connection, i.e. causation.[546] A similar scenario can provide the solution for the mystery of "the missing shade of blue": having experienced the regular succession of shades, a similar determination of the mind can give rise to the impression necessary for the idea of the missing shade.

The Physiology of Mind: The Study of Its Normal Functioning

Given that we cannot directly observe our faculties or their principles, we can only chart our "mental anatomy" via inferences from their effects. Introspection is of no use here: reflecting on mental processes distorts them, so self-observation or contrived inner experience cannot be appropriate ways of studying them, as they "wou'd so disturb the operation of my natural principles, as must render it impossible to form any just conclusion from the phænomenon".[547] Hume's anatomical project proceeds via the study of processes taking place in the mind, and its proper method is to find analogies

among a variety of human phenomena and tracing them back to their causal sources.

This task converges with the contemporary understanding of medical anatomy and physiology. Cullen, for example, shares this view of the anatomist's task when he says "from anatomy you know minutely the structure of the human body itself", a knowledge to be augmented with physiology from which "you know the general laws by which the animal economy is governed, and these detailed in explaining the function of each particular part".[548] But due to Hume's functionalist outlook, "parts and powers" cannot be separated: we have no direct introspective access to the mind's parts; therefore we can have no knowledge of its anatomy as independent of the functioning of its different parts. Given Hume's anatomy metaphor, it is only through a physiology of the mind, i.e. through the study of the general laws of its normal functioning, that we can have access to its anatomy.

Apart from occasional excursions into the territory of actual physiological explanations, Hume keeps his science of man as an autonomous domain of explanations. Nonetheless, these scattered passages are enough to testify that he did not consider the body as a purely mechanical or hydraulic machine in a Boerhaavean manner. Instead he shares the view of Cullen and other Scottish physiologists like Porterfield and Whytt, namely, that mind and body mutually influence one another.[549] In these passages, for example, Hume turns to a physiological explanation of mistakes in reasoning couched in terms of animal spirits, or argues from the analogies between human and animal anatomy and physiology that the mental capacities of animals must be similar to those of humans, different mostly in degree and not in kind.[550]

Beyond this implicit and vague adherence to *some* sort of physiological theory, it is also true, at a more general level, that the Humean *language* of human nature is predominantly a language of active vital forces *and* qualitative, chemical changes, and not of the widespread image of an "Enlightened Automata".[551] It is his language and method that associates him with Enlightenment vitalism and also with philosophical chemistry and vitalist physiology in Scotland at that time.

Hume's perspective can also be characterized by those commitments which, as Peter Hans Reill argues,[552] became widely accepted among natural philosophers during the course of the eighteenth century. Accordingly, human nature is a compound whose

constituents are not separable by mechanical means but by qualitative analysis. Human phenomena are thus derived from the interactions of different active components that can be decomposed only to a certain point, whose qualitative differences are never entirely resolved, and whose combination is regulated, also depending on qualitative differences. This is the language Hume speaks while exploring the physiology of the human mind, and not the mechanical language of external forces acting on homogenous ingredients.

If ideas and impressions are considered qualitatively uniform, then it is particularly temping to say that the way Hume envisages the interaction of ideas and impressions is modelled on Newton's theory of gravity.[553] It seems, the principles of *association* are especially susceptible of such an interpretation. And indeed, we have seen that ideas are partly characterized by a mechanical description, especially by their solidity and their capability of forming a union only by conjunction, which preserves their atomistic identity, and not by mixture.

On the surface, it makes sense to say that out of the three principles of association between ideas, i.e. cause-effect, spatio-temporal contiguity, and resemblance, at least two, namely cause-effect and contiguity, seem to be mechanistically respectable. But resemblance, as we have seen above, should incite our suspicion, as it cannot be conceived as a mechanical only as an intentional relation which implies the active contribution of the mind. On second thought, cause-effect and contiguity do not fare much better against a mechanical background. Ideas are qualitatively different; they do not differ in shape, size and solidity but in *content*, i.e. in what they represent. Representational contents, and not mechanical features, are the properties on which possible associations depend, and it is also this content that determines the contribution they can make in complex ideas.

Traces of a qualitatively focused mental physiology are especially conspicuous in Hume's theory of passions. In some passages Hume seems to echo George Cheyne's metaphorical language of musical instruments,[554] and *prima facie* this may suggest Hume's adherence to a mechanical outlook. As Cheyne writes, the brain where "the Nerves, or Instruments of Sensation terminate" is "like a *Musician* in a finely fram'd and

well-tune'd Organ-Case", and "these Nerves are like *Keys*, which, being struck or touched convey the Sound".[555] For Hume the mind with respect to the passions is

> not of the nature of a wind instrument of music, which in running over all the notes immediately loses the sound after the breath ceases; but rather resembles a string-instrument, where after each stroke the vibrations still retain some sound, which gradually and insensibly decays. The imagination is extreme quick and agile; but the passions are slow and restive: For which reason, when any object is presented, that affords a variety of views to the one, and emotions to the other; 'tho the fancy may change its views with great celerity; each stroke will not produce a clear and distinct note of passion, but the one passion will always be mixt and confounded with the other. According as the probability inclines to good or evil, the passion of joy or sorrow predominates in the composition.[556]

Although on the face of it this passage suggests a mechanical imagery of strings, vibrations and winds, the actual emphasis is on qualitatively different passions mixing together, just like sounds, in an unclear and indistinct manner so as to result in a composition.

Hume's passions are secondary impressions produced by the faculty of reflection, and are founded on the pleasant or unpleasant character that conjoins some ideas or primary impressions. The natural path of a single passion, conceived theoretically as a separate entity, is characterized as a qualitative and directional change over time.[557] Association by resemblance determines the direction of change, the only way passions can be associated, and the process can be strengthened by the association of the ideas that play a role in the production of the given passions either as their causes or as their objects.[558] The actual dynamics of the passions is, of course, more complex, as there are several passions at any time interacting in the mind, induced by legions of impressions and ideas constantly present to it. This interaction is described with instructive similes:

> Upon the whole, contrary passions succeed each other alternately, when they arise from different objects: They mutually destroy each other, when they proceed from different parts of the same: And they subsist both of them, and mingle together, when they are deriv'd from the contrary and in compatible chances or possibilities, on which any one object depends. The influence of the relations of ideas is plainly seen in this whole affair. If the objects of the contrary passions be totally different, the passions are like two opposite liquors in different bottles, which have no influence on each other. If the objects be intimately connected, the passions are like an *alcali* and an *acid*, which, being mingled, destroy each other. If the relation be more imperfect, and consists in the contradictory views of the same object, the passions are like oil and vinegar, which, however mingled, never perfectly unite and incorporate.[559]

More than figurative speech, this is perfectly consistent with the above-quoted passage in which Hume draws a qualitative distinction between ideas and impressions. And it is now hardly surprising to see that there are qualitative differences between passions as well, and that their interactions, which can again be seen in terms of elective attractions, are founded on those differences. Unlike Newton's forces in the *Principia*, the principles of interaction in Hume's mental world are sensitive to differences in kind that resist effective mathematization, and belong more organically to the view championed by naturalists such as Cullen in Scotland and Buffon at the same time on the Continent with the emphasis they put "on the principles of comparison, resemblance, affinity, analogical reasoning" and on explanations in terms of "inner, active forces as central agents in nature".[560]

Probably there is no better example of an active force in Hume's *Treatise* than the operation of *sympathy*, which "is nothing but the conversion of an idea into an impression by the force of imagination."[561] The process is simple: from external signs, gestures, speech, etc. we form an idea, via inferences, about what goes on in the other's mind, and sympathy turns this idea into its corresponding impression so that we can literally feel what the other feels.[562] Sympathy is thus an internal active principle of the mind which transforms ideas into impressions thereby facilitating communication of

opinions and affections. As it makes us sensitive to the feelings of others, this faculty can aptly be called the basis of sociability. Sympathy is responsible for the bonds in the social world, and as such it is analogous with the cohesive force in the world of living organisms:

> this is still more remarkable, when we add a *sympathy* of parts to their *common end*, and suppose that they bear to each other, the reciprocal relation of cause and effect in all their actions and operations. This is the case with all animals and vegetables; where not only the several parts have a reference to some general purpose, but also a mutual dependance on, and connexion with each other.[563]

Sympathy establishes similar reciprocal relations in human interaction, as it is due to it that "the minds of men are mirrors to one another".[564] It is thus by the concept of sympathy where the ideas of an organic nature and human nature, the language of chemical reactions and human interactions are contiguous: living things and society are both organized by their peculiar principles into an organic whole.[565] And it is the same image that applies to the functioning of the various organs of the human mind.

As Hume's examples and metaphors suggest, he adopted a perspective and spoke a language that is convergent to vitalistic tendencies in the Enlightenment. For Hume the mind is like an organized living body whose anatomy (the structure of its organs, i.e. faculties) is accessible only through its physiology (the study of its normal functioning). The mind is a decentralised system of functional centres characterised by the specific activity they exert on sensations. These functional parts are linked together by various forms of interconnection, interaction and mutual reciprocity. Through the reciprocal relations between various processes Hume charts the anatomy of the mind in which the non-modular interaction of various faculties adds up to a harmonious whole. Appreciating this vitalistic character of Hume's project, and the language he is using while developing it, helps us to a better understanding of what was really important to Hume: the principles of human nature.

Philosophy and Morals

VIII. The Objectivity of Moral Inquiry in Hume

As Lorraine Daston and Peter Galison have shown,[566] 'objectivity' is a multifaceted concept, the development of which has a long and rich history. In their presentation, objectivity is listed among the cardinal epistemic virtues in modern times that had gone through a complex process of evolution before it emerged in a full-blown version in the nineteenth century. Several important aspects of this modern concept of objectivity that became dominant in the natural sciences derive from eighteenth-century aesthetics and moral philosophy, and as such they are partly due to the conceptual work done by David Hume.[567]

Although 'objectivity' as a term does not figure in Hume's writings, its conceptual relatives, namely like 'impartiality' and the 'common point of view', do play an important role in them. As I will try to show, the idea of a full-blown objectivity, i.e. a perspective that is detached from the biases and distortions of *any* point of view, is alien to Hume's epistemology. Hume's aim in his *Treatise of Human Nature* (1739/40) is to explore the specifically human point of view and its contribution to cognition, morality and aesthetic judgement, and there is no room in its framework for a genuinely objective perspective exempt from the constraints of our constitution – and this diagnosis also holds for his *An Enquiry concerning the Principles of Morals* (1751).

Objectivity in this sense is an unattainable ideal: one main lesson Hume teaches us is that we cannot transcend the boundaries of our sensitivity and cognitive constitution. We can at most aspire to be aware of the limitations inherent in, and possibilities arising from them – this is the reason why all the sciences must depend, at least to some extent, on the science of human nature.[568] Even if genuine objectivity is beyond our reach, we still can abstract from our personal biases and individual perspective by taking the perspectives of others into account. And thereby assuming a common point of view we can exercise impartial judgment.

Here I intend to explore how the conceptual relatives of 'objectivity' inform Hume's moral philosophy and his theory of moral cognition. In doing so, I borrow from

Daston and Galison two terms designating epistemic virtues that preceded 'objectivity', namely *aperspectival objectivity* and *truth-to-nature*, and I will reconstruct Hume's position while arguing for the following claims: 1) there is an important distinction to be drawn between moral *philosophy* and moral *cognition* as Hume envisages them. Moral cognition, i.e. the process of making moral judgment, is a common part of social practice, while moral philosophy is a theoretical enterprise that, among other things, comprises a theory of moral cognition. 2) Hume maintains that *aperspectival objectivity as impartiality* is a necessary condition for moral cognition, but this kind of objectivity is intrinsically bound up with the human point of view. 3) Moral philosophy, at least as Hume conceives it, is an enterprise continuous with natural philosophy in its aims of description and explanation. *Truth-to-nature* is a chief epistemic virtue in the enterprise of Humean moral philosophy, which also indicates its continuity with contemporary natural philosophy, but it is a virtue that does not entail going aperspectival.

As Daston puts it, the essence of aperspectival objectivity is communicability, and it is about "eliminating individual (or occasionally group) idiosyncrasies".[569] Daston's concept will have to be further refined in order to be a useful tool of analysis in the context of Hume's philosophy. There are at least two different ways of being aperspectival. The first and weaker sense of the term is to understand it as detached from *any particular* human perspective, that is, to be detached from particular interests, points of view, and personal sympathies. For Hume, this stance, the "common point of view", ensures the possibility of *impartial* evaluation and it is the essence of moral evaluation:[570] without being impartial one could only express personal (and thus not moral) sentiments, tastes and distastes, but not moral ones. Yet, being impartial does not amount to being genuinely aperspectival, because impartiality so understood is still a profoundly *human* perspective.

The stronger or more genuine way of being aperspectival would consist in adopting a "view from nowhere", as Thomas Nagel's happy phrase has it, i.e. in a perspective detached from our human point of view by leaving "even just human perspective behind".[571] One way of adopting this latter perspective leads through the idea of universal reason:

> Reason, if there is such a thing, can serve as a court of appeal not only against the received opinions and habits of our community but also against the peculiarities of our personal perspective. It is something each individual can find within himself, but at the same time it has universal authority. Reason provides, mysteriously, a way of distancing oneself from common opinion and received practices that is not a mere elevation of individuality – not a determination to express one's idiosyncratic self rather than go along with everyone else. Whoever appeals to reason purports to discover a source of authority within himself that is not merely personal, or societal, but universal – and that should also persuade others who are willing to listen to it.[572]

As I will argue in what follows, although for Hume moral philosophy belongs to the realm of reason, his concept of reason is certainly not of a faculty that allows us to leave our distinctively human perspective behind. On the contrary, reason is a faculty that belongs to human nature and finds its place only in the context of human conduct. Even if someone adopts the perspective of reason, for Hume it still remains *human* reason through and through.

While describing the process of moral cognition Hume therefore incorporates aperspectival objectivity *as* impartiality – but not as genuinely aperspectival objectivity – assuming a "common point of view" from which moral cognition is possible at all, and which is thought of as being independent of any particular human perspective. Morality for Hume concerns only human matters, and it has no reference outside the realm of human relations. Thus, impartiality is a human capacity, and morality cannot be understood outside the context of human nature and action – and most importantly: it cannot be understood in terms of objectivity as being detached from the human point of view.

As I have illustrated above from various angles, moral philosophy for Hume is a descriptive and explanatory enterprise that is to be laid on the foundations of disinterested observation, and ideally conceived as being devoid of the distorting influences of preconceptions or ideologies. This commitment was not at all common at

that time, as moral philosophy was more often pursued from a normative-teleological perspective and with a commitment to religious considerations.

As I will argue below, the epistemic ideal of Humean moral philosophy is detached from these considerations, and it consists instead in what Daston and Galison call *truth-to-nature*. Accordingly, Humean moral philosophy aspires to what most eighteenth-century naturalists, like Linnaeus, Goethe, d'Alembert, Diderot, and others also aspired to, namely "to reveal a reality accessible only with difficulty", an enterprise in which "[t]he eyes of both body and mind converged to discover a reality otherwise hidden to each alone".[573] The product of this investigation is a "reasoned image" of the epistemic object, which is human nature in Hume's case.[574] In this process the object of knowledge gets represented in a generality that transcends the individual differences of entities that belong to the same type in order to reach a higher level of truth about them, by showing a fundamental unity concealed by the diversity of their various appearances and manifestations. In this way, the reasoned image of a given type, i.e. a plant, an animal, or human being, "was truer to nature – and therefore more real – than any actual specimen".[575]

In this vein, Hume's theory of human nature aims to find a similar unity in variety: it aims to explore the fundamental principles of human functioning and to explain by them characteristic human phenomena from cognition to society. His method of exploring human nature relies primarily on the observation of human behaviour and by analogical reasoning he reveals a handful of principles whose combination explains the variety of human phenomena.[576] Hume's method is thus in concert with "the concrete practices of abstract reason as understood by Enlightenment naturalists: selecting, comparing, judging, generalizing. Allegiance to truth to nature required that the naturalist be steeped in but not enslaved to nature as it appeared."[577]

As a consequence of being directed by different epistemic virtues, moral cognition and moral philosophy are largely independent practices for Hume. It is thus hardly surprising that Hume's moral philosophy has no direct influence on moral cognition, on the practice of making moral judgement. Moral philosophy is instead, at least partly but crucially, about exploring the causal mechanisms working in the background of moral cognition, and therefore normative ethics is not an integral part of

Humean moral philosophy – while it does contain a theory of moral cognition. Correspondingly, the moral philosopher's task is quite distinct from that of the moralist whose project is continuous with everyday moral cognition: while the former is descriptive and explanatory, the latter is normative and evaluative.

As such, they belong to the realm of distinct faculties and serve different purposes. Moral philosophy is concerned with facts about human nature, and thus belongs to the realm of probable reasoning. Its aim is to produce satisfactory and useful theoretical knowledge gained from an accurate representation of human nature: it serves the purposes of understanding and policy-making from a third-person, observer perspective. Moral cognition belongs to the realm of imagination and moral sense, it serves the purposes of our interaction and sociability, and as such it belongs to our second-person, participant perspective.[578]

Moral cognition or the participants' common point of view

For Hume moral cognition is founded on moral sentiments, i.e. secondary impressions that arise upon seeing or remembering some situation. Having moral impressions is thus dependent on having primary impressions of the senses, and also on having a faculty of the mind that provides the relevant secondary impressions, i.e. moral sense. It takes some reflection to reveal the difference between sense impressions and the impressions of the moral sense,[579] and therefore it is easy to mistake moral qualities for the qualities of the objects of sense perception, a mistake that consists in false beliefs about the status and origin of moral qualities. This gives ground to a false conception of morality that treats moral properties as observer-independent, objective properties of objects themselves. But as Hume emphasizes, morality does not consist in any "matter of fact": vice and virtue "are not qualities in objects, but perceptions in the mind".[580]

Another related feature of moral cognition, as Hume envisages it, is that it does not belong to the realm of reason because, in spite of all the efforts of moral

philosophers, it is not founded on *a priori* demonstrable principles but on our moral sense:

> That Faculty, by which we discern Truth and Falsehood, and that by which we perceive Vice and Virtue had long been confounded with each other, and all Morality was suppos'd to be built on eternal and immutable Relations which, to every intelligent Mind, were equally invariable as any Proposition concerning Quantity or Number. But a late Philosopher [Francis Hutcheson] has taught us, by the most convincing Arguments, that Morality is nothing in the abstract Nature of Things, but is entirely relative to the Sentiment or mental Taste of each particular Being; in the same Manner as the Distinctions of sweet and bitter, hot and cold arise from the particular Feeling of each Sense or Organ. Moral Perceptions therefore, ought not to be clas'd with the Operations of the Understanding, but with the Tastes or Sentiments.[581]

This frequent mistake of philosophers is not exclusively due to flawed reasoning, but also to a deceiving feature of moral impressions, namely that they are easily mistaken for ideas. Impressions are violent perceptions received by the mind: they are more forceful and vivacious than the ideas that derive as copies from them. With respect to ideas the mind enjoys a greater degree of autonomy because they can be easily compared and combined, i.e. manipulated by the imagination and reason.

Moral cognition, however, is not founded on the *comparison* of ideas by these faculties, albeit we do have moral ideas as copies of moral impression. Instead, it is the faculty of moral sense that produces moral impressions whose important feature is that they are "calm", not violent, and as such they can be easily mistaken for ideas.[582] This mistake can suggest that while making moral judgments we have to deal with ideas, not impressions, and thus moral cognition is easily subsumed falsely under the faculty of reason.

However natural this deceiving phenomenological appearance may be, moral cognition for Hume is to be grounded in a way of *sensing* and not in reasoning.[583] Moral

sense is just a special source of perception and moral sensing is the process that provides us with the relevant impressions for moral ideas whose truth consists in their agreement with the impressions they copied. Reasoning is just the process of discovering truth and falsehood by comparing perceptions (ideas with ideas, and ideas with impressions), so the truth of moral ideas consists in their accurate representation of the impressions supplied by our moral sense. A moral belief (which is just a lively idea) can thus be as true or as false as the belief that the tomato in front of me is red. Given this competence of reason, it alone cannot supply moral judgments, nor can it produce motivation for action; but it does have a role to play in both processes by discovering truth or falsity. In order to have moral judgments and moral motivation we need something else: a moral sentiment, which is a feeling supplied by moral sense.

As a consequence of these two features of Hume's theory of moral cognition, i.e. its anti-objectivism and anti-rationalism, morality turns out to be an entirely human matter lacking any reference to the world as it is without moral agents, or to rational beings without the capacities relevant for moral sensing. Moral properties are part of the world's fabric because of the way we are, i.e. because of the particular constitution of our human nature. Morality, therefore, is not aperspectival in the strong sense: a Nagel-style suggestion of reaching objectivity by means of universal reason is not an option from Hume's stance. However, in the weaker sense, aperspectival objectivity *as* impartiality means a sober constraint on moral cognition that Hume's moral sensing view can, and indeed intends to, accommodate.

Moral sense is a peculiar faculty of the mind. It is constitutive and distinctive of human nature, meaning that lacking it questions even one's membership in the human race, and having this faculty distinguishes human beings from animals.[584] Although moral sense is constitutive of human nature, it is not uniform historically and geographically: it can be conditioned in various ways, depending on the circumstances in which a community lives. In ancient Rome, for example, courage was esteemed to a degree that in Hume's days would not count as virtue but extremity, but given the circumstances in which that society lived, i.e. "the continual wars" the Romans were waging, their esteem for this character trait is understandable – even if it "would sound a little oddly in other nations and other ages".[585]

The two main guiding principles of moral sense are utility and agreeableness of character traits, and these properties are not distributed equally among the character traits in every age and everywhere. There is thus a flavour of *relativism* around Hume's theory of moral evaluation, even if the virtuous status of some of the character traits are indeed universal such as those belonging to natural abilities and the virtues of greatness of mind and of benevolence.[586] This suggests that some of the virtues are universally esteemed, which is consonant with Hume's view that some of the principles of human nature are stable and universal, but there are also contingent principles that emerge under the pressure of social and historical circumstances.[587] Correspondingly, there are virtues that emerge due to the necessity of living under social conditions, and these are labelled *artificial virtues*.

The functioning of moral sense is dependent on another faculty, namely sympathy. This faculty enables us to feel what others feel: upon seeing the behavioural signs of some passion or emotion, we infer the idea of that affection, and here sympathy enters: it "converts" this idea into its corresponding impression:

> When I see the *effects* of passion in the voice and gesture of any person, my mind immediately passes from these effects to their causes, and forms such a lively idea of the passion, as is presently converted into the passion itself. In like manner, when I perceive the *causes* of any emotion, my mind is convey'd to the effects, and is actuated with a like emotion.[588]

This is the only faculty capable of transforming ideas into impressions, which is the reverse way of the standard process, ideas being normally copied from impressions.

Furthermore, sympathy is a highly selective faculty of the mind, as it does not transform just any idea back into its corresponding impression: it only transforms those ideas that are relevant for moral evaluation, and it works more effectively with those standing in close relation to us.[589] By making us feel what those involved in a situation feel, sympathy helps us to judging how others are affected in the given situation. The role of sympathy in moral evaluation is to make us *feel* how a given character trait effects

others, or the one who has it. If it brings pleasure or advantage, then we approve of it, if it does harm, then we disapprove. This is the basis of making moral judgement.

So the process of moral cognition goes roughly like this: upon seeing some situation we are supplied with sense impressions that are duly turned into ideas. Upon reflecting on this situation we do two things: first we trace back the behaviour of those involved to their causal origins, i.e. to motives and intentions as caused by, or consisting in, character traits. Secondly we take into consideration how those influenced are being affected by the traits responsible. The first aspect is a clear instance of causal reasoning: we take external behaviour to be a sign of character traits and from them we infer those traits. Sympathy plays a crucial role in the second respect, and it can be deployed in imaginary as well as actual situations.[590] Therefore we can approve character traits whose beneficiary consequences are prevented by external circumstances, and we can approve good intentions even if they result in harmful consequences.

Up to this point Hume's account of moral cognition leaves ample space for making entirely subjective and idiosyncratic judgements, and thus it would make moral evaluation a personal and partial business. At this stage moral sense may seem universal, but the way it is conditioned is historically contingent, it has a propensity to favour those close to us, and it is grounded in subjective feeling. As it stands, it is a source of biased judgement not worthy of being treated as moral judgement. Yet there are processes balancing this bias that drive toward *impartiality*:

> every particular man has a peculiar position with regard to others; and 'tis impossible we cou'd ever converse together on any reasonable terms, were each of us to consider characters and persons, only as they appear from his peculiar point of view. In order, therefore, to prevent those continual *contradictions*, and arrive at a more *stable* judgment of things, we fix on some *steady* and *general* points of view; and always in our thoughts, place ourselves in them.[591]

Adopting this perspective is not the product of reasoning, it is not reached through abstraction or generalization, but through taking an imaginary stance that emerges from

leaving behind what is peculiar to our personal point of view.[592] Reached by the means of moral communication, this common point of view ensures the possibility of overcoming the biases of personal perspective. This process is similar to the judgement of understanding being transferred to the senses and thereby correcting impressions arising from a particular perspective.[593] The difference between the two processes is that transferring the judgments of understanding to the senses is purely a matter of our cognitive architecture, while adopting the common point of view consists in the correction of biased and situated sentiments that is possible only through social interaction, i.e. by acquaintance with the perspective of others.[594] This is a prerequisite for the possibility of consonant moral evaluations, which must be consonant to a considerable extent in order to be useful in future social interactions.

Moral sense for Hume is thus essentially social, and it is a source of impressions that is sensitive to situations only if viewed from the common point of view. From this perspective only the social effects of a character trait count for moral evaluation, i.e. the effects on those with whom the person possessing a given character trait interacts, the members of the community in which a given person lives:

> when we consider, that every particular person's pleasure and interest being different, 'tis impossible men cou'd ever agree in their sentiments and judgments, unless they chose some common point of view, from which they might survey their object, and which might cause it to appear the same to all of them. Now, in judging of characters, the only interest or pleasure, which appears the same to every spectator, is that of the person himself, whose character is examin'd; or that of persons, who have a connexion with him. And 'tho such interests and pleasures touch us more faintly than our own, yet being more constant and universal, they counter-ballance the latter even in practice, and are alone admitted in speculation as the standard of virtue and morality. They alone produce that particular feeling or sentiment, on which moral distinctions depend.[595]

Thus moral sentiment arises when we imagine a situation exclusively from the perspective of those involved, i.e. as detached from our partial perspective. Taking the common point of view serves the purpose of correcting our biased and situated sentiments and thereby facilitating reliable judgments for useful interaction.

Moral sense and imagination concur in this process: imagination supplies the common point of view and moral sense delivers an impression, typically a "calm passion", that arises from this impartial point of view. As the impression is a "calm passion" it is easily overridden by our stronger, and typically biased passions that arise from our personal point of view, and thus the process of correcting sentiments is not always successful:

> tho' the heart does not always take part with those general notions, or regulate its love and hatred by them, yet they are sufficient for discourse, and serve all our purposes in company, in the pulpit, on the theatre, and in the schools.[596]

Even if moral sentiments may sometimes be suppressed, they can motivate our social interactions, and practical reasoning,[597] because it is the insight we gain from the common, impartial point of view that provides reliable information on the causal background of people's behaviour.

Expressing judgments from the common point of view has its own peculiar vocabulary, and speaking the language of moral evaluation, along with its associated sentiments, helps us keep a distance from our personal biases, and to stick to the common point of view:

> When a man denominates another his *enemy*, his *rival*, his *antagonist*, his *adversary*, he is understood to speak the language of self-love, and to express sentiments, peculiar to himself, and arising from his particular circumstances and situation. But when he bestows on any man the epithets of *vicious* or *odious* or *depraved*, he then speaks another language, and expresses sentiments, in

> which he expects all his audience are to concur with him. He must here, therefore, depart from his private and particular situation, and must choose a point of view, common to him with others.[598]

Moral language and moral discourse with others help us with correcting the impressions we gain from our particular point of view, and with adopting the common point of view with more success, by increasingly assimilating its standards. Moral discourse is therefore essential to the emergence of an impartial stance for moral evaluation:

> without such a correction of appearances, both in internal and external sentiment, men could never think or talk steadily on any subject; while their fluctuating situations produce a continual variation on objects, and throw them into such different and contrary lights and positions. The more we converse with mankind, and the greater social intercourse we maintain, the more shall we be familiarized to these general preferences and distinctions, without which our conversation and discourse could scarcely be rendered intelligible to each other. Every man's interest is peculiar to himself, and the aversions and desires, which result from it, cannot be supposed to affect others in a like degree. General language, therefore, being formed for general use, must be moulded on some more general views, and must affix the epithets of praise or blame, in conformity to sentiments, which arise from the general interests of the community. And if these sentiments, in most men, be not so strong as those, which have a reference to private good; yet still they must make some distinction, even in persons the most depraved and selfish; and must attach the notion of good to a beneficent conduct, and of evil to the contrary. Sympathy, we shall allow, is much fainter than our concern for ourselves, and sympathy with persons remote from us much fainter than that with persons near and contiguous; but for this very reason it is necessary for us, in our calm judgements and discourse concerning the characters of men, to neglect all these differences, and render our sentiments more public and social.[599]

Taking shape this way, the common point of view grants us the possibility of impartial moral evaluation. It is thus a perspective that satisfies the requirements of being aperspectival in the first sense characterized above, but it fails to be so in the second sense, as it is not a point of view detached from the determinations of human condition, which could be e.g. accessible for some universal reason.

Moral cognition presupposes characteristically human capacities, membership in a community, and participation in social exchange. It is through social interaction that we come under pressure to adopt the common point of view, which is essentially defined by the perspectives of the person under moral scrutiny and those interacting with him. From Hume's perspective there is thus no need in moral cognition to be aperspectival in the strong sense, as moral cognition responds to the needs of social life, and to the peculiar standing of human beings in this world – and nothing beyond or above it.[600]

Moral philosophy or truth-to-human-nature

The central epistemic virtue of moral philosophy differs from that of moral cognition, and impartiality in the sense of being devoid of the influence of a particular perspective does not play a crucial role here. Almost on the contrary, the philosopher's personal judgment plays an indispensable role in exploring moral phenomena and his subjectivity cannot be excluded from the process of cognitive inquiry. As Hume puts it,

> all probable reasoning is nothing but a species of sensation. 'Tis not solely in poetry and music, we must follow our taste and sentiment, but likewise in philosophy. When I am convinc'd of any principle, 'tis only an idea, which strikes more strongly upon me. When I give the preference to one set of arguments above another, I do nothing but decide from my feeling concerning

> the superiority of their influence. Objects have no discoverable connexion together; nor is it from any other principle but custom operating upon the imagination, that we can draw any inference from the appearance of one to the existence of another.[601]

As Hume sees it, the philosopher's, and the lay person's, subjectivity enters into cognition in a way that is incompatible with a robust ideal of objectivity. Hume's position in this respect is similar to that of many prominent naturalists in the eighteenth century. As Daston and Galison point out, Linnaeus, for one, would have ridiculed the idea that scientific knowledge should be generated in an impersonal way, and that the most valuable pieces of knowledge are those that are independent of the personal traits of those producing knowledge.[602]

Indeed, Hume shared Linnaeus's conviction that one should possess or develop certain character traits in order to elevate moral philosophy (i.e. the study of phenomena peculiar to moral beings *qua* moral beings) to the cognitive standing it should reach alongside natural philosophy. Hume's scattered methodological remarks are interwoven with more or less explicit prescriptions concerning the character one should develop in order to make a valuable contribution to the advancement of moral knowledge. For example, one should be wary not to be inclined to consult one's own fancy in moral philosophy, meaning that one should not rush into theorizing ungrounded in facts, which, as he complains, was characteristic of the classic authors of moral philosophy.[603] As he says elsewhere, this inclination is particularly strong if one has religious motivations, which suggests that religious conviction is an obstacle to both natural and moral inquiry.[604]

The most important character trait of any student of human beings as moral beings is a capacity for keen observation, which was also generally posed as a requirement at that time for naturalists of any kind.[605] Observation for Hume does not consist exclusively in collecting minute details or in taking note of singular data not noticed by others. What really matters for the science of human nature, and nature in general too, is the capacity for *detecting resemblances* and *establishing analogies*. As Hume repeatedly emphasizes, it is impossible to reveal the "ultimate causes of our

mental actions", and we have to be content with "experience and analogy" in explaining any act of the mind "by producing other instances, which are analogous to it, and other principles, which facilitate its operation".[606] Finding analogies between different instances gives the chance of explaining causes and reducing them to "more general principles".[607]

For Hume, *analogical reasoning* is the key to most of our everyday and philosophical conclusions in empirical matters. Causal reasoning is partly but crucially founded on our capacity to recognize resemblances among different instances, and to extend our inferences based on previous observations to similar but unobserved instances. Thus the recognition of resemblances is at the heart of our reasoning concerning any matter of fact, and the limits of this kind of reasoning are exactly where our capacity to recognize resemblances ends:

> Without some degree of resemblance, as well as union, 'tis impossible there can be any reasoning: but as this resemblance admits of many different degrees, the reasoning becomes proportionably more or less firm and certain.[608]

However, Hume is very much aware that recognising resemblances is a universally shared but *subjective* and *creative* act of the mind. Things are similar in an infinite number of ways, and only some of these similarities can be exploited from the human point of view with the hope of cognitive benefit.[609] As any thing may resemble any other in an infinite number of ways from among which only some can bear real explanatory power and provide insight into mechanisms underlying phenomena, only some resemblances can explain associative relations between ideas. Resemblances of cognitive relevance are therefore not passively detected, but they are actively produced by a faculty of the mind, namely memory: we remember past instances *as* resembling.[610]

So the process of analogical reasoning relies on a subjective process that may have potentially idiosyncratic manifestations. Depending on the resemblances one recognizes among particular instances, one can end up with different and potentially

conflicting conclusions concerning the causes of phenomena. Therefore, as Hume puts it:

> No questions in philosophy are more difficult, than when a number of causes present themselves for the same phaenomenon, to determine which is the principal and predominant. There seldom is any very precise argument to fix our choice, and men must be contented to be guided by a kind of taste or fancy, arising from analogy, and a comparison of similar instances.[611]

Subjectivity is thus not a distorting influence on philosophical inquiry, but it has a positive heuristic role to play, which can be appealed to as a source of creativity and insight; at the same time, however, it constrains the objectivity of philosophical inquiry. Accordingly, impartiality in Hume's *philosophical* project is not a crucial epistemic value – quite unlike in the process of moral evaluation.

As the purpose of this inquiry is to produce a reliable map of the powers and faculties of the mind, the main epistemic virtue it may have is accuracy, due to which it can serve the purposes of policy making and facilitate knowledge production in other fields by revealing the cognitive means we possess. While this inquiry may not result in knowledge of some human essence, it can be "accurate" and "exact", and so it can satisfy our curiosity, and can be useful as well.[612]

Conclusion: Separating moral cognition and moral philosophy

Given his vision of what moral philosophy should aspire to, Hume quite unsurprisingly claims that moral philosophy can have only indirect normative consequences: knowing the anatomy of human nature can be useful for the moralist in the same sense as knowing the anatomy of human body can be useful for the painter:

> We must have an exact knowledge of the parts, their situation and connexion, before we can design with any elegance or correctness. And thus the most abstract speculations concerning human nature, however cold and unentertaining, become subservient to *practical morality*; and may render this latter science more correct in its percepts, and more perswasive in its exhortations.[613]

Knowledge of the anatomy of human nature allows for drawing conclusions about what is good or useful for this particular constitution, and this can result in normative considerations on how to act in various situations, or how to change the circumstances so as to ensure in a given situation the desirable action of those involved. Only knowledge of this anatomy can provide a firm foundation for putting forward normative claims concerning the correct course of behaviour to be followed under various circumstances.[614]

Hume's theory of moral cognition is a theory of *practice* that explains how moral cognition is facilitated by the interaction of various human faculties like reflection, reason, imagination, and sympathy. Through this exploration we are provided with a theory on the nature and limits of a human, innerwordly morality, whose constitutive epistemic virtue consists in its aperspectival aspirations – as far as our human constitution allows. This epistemic virtue is manifested in the evaluative practice of those taking part in social interactions, and it is a virtue to observe from the *participant's perspective* under the pressure of the requirement of living under social conditions and the consequent need to contemplate actions as detached from our personal biases.

Moral philosophy for Hume is a *theoretical* enterprise that aims to describe the processes responsible for the practice of moral evaluation, and explain them as part of a comprehensive account of human capacities and their functioning. The main epistemic virtue of this enterprise is truth-to-nature, which directs the investigation that reveals the specific and constitutive features of human nature from its various and impure manifestations in history and common life. This enterprise is conducted from the *observer's perspective* and relies on the subjective capacities of the observer, especially on his keen observation and capacity to reveal resemblances and establish explanatory

analogies through them. The aim is not to produce a body of objective knowledge detached from personal perspectives – that is not even an attainable ideal for philosophical knowledge, as it is judged by taste.

Now, it seems obvious that moral cognition is relevant for moral philosophy only as part of its *explanandum*. The end product of moral cognition is motivation, and as such it falls into a different category than theoretical understanding aimed at by moral philosophy. Moral cognition has direct practical relevance, but no theoretical output. The question is more intriguing in the reverse way: can moral philosophy influence moral evaluation? According to Hume's official position, moral philosophy is a theoretical enterprise, and as such it has only indirect relevance for moral practice: it supplies a theory of moral practice but does not directly change it. However, relying on the anatomy of human nature provided by the moral philosopher, a *moralist* can only put forward his precepts and evaluative considerations with the assistance of the knowledge provided by the moral philosopher – just like a painter needs the anatomist's knowledge for his art.

This suggests that moral philosophy can enter moral cognition through the moralists' work, professional or otherwise, i.e. via discussing moral precepts and evaluations, whose discussion can be more or less founded on insights gained from (proper, i.e. experimental, true-to-nature) moral philosophy. As we have seen above, the moral discourse one enters as a moralist is instrumental in refining and correcting impressions we gain from our particular points of view, facilitates taking others into due consideration, and thus it is indispensable for achieving aperspectival, i.e. impartial, moral judgement aimed at the process of moral cognition.

Given the fact that accepting the conclusions of moral philosophy depends largely on subjective factors such as taste and resemblances, the contribution of moral philosophy to aperspectival evaluation is limited. Pursuing truth-to-nature in matters of human nature does not produce an aperspectival stance for moral cognition, but through moral discourse it enriches and refines the common point of view from which moral sentiments should arise. It is through the common point of view that the conclusions of philosophical reasoning can be transferred to moral sense. Therefore, if

viewed from the angle of moral cognition, the main import of moral philosophy consists in its contribution to the delicacy of moral taste.

Conclusion

On the preceding pages I have tried to illustrate the thesis that Hume's work can be meaningfully assigned a place in the context of eighteenth-century Scottish Newtonianism, and I have outlined this place with reference to methodological considerations on the one hand and to the ideology of knowledge that mainstream Newtonians adopted in making sense of their own cognitive enterprise.

Hume's place in the tradition of Scottish Newtonianism can be specified in the context of both Newtonian moral philosophy (i.e. in relation to the work of David Fordyce, Francis Hutcheson, George Turnbull and Adam Smith), and in the context of Newtonian chemistry and physiology (i.e. in relation to Archibald Pitcairne, George Cheyne, William Cullen and William Porterfield among others). In this context Hume occupies a unique place: his moral philosophy abandons the mathematical tendencies discernible in the work of many of his older contemporaries, and develops a vitalistic language of human nature that is senstivie to qualitative differences – a conceptual framework that is related to the language Scottish chemistry and physiology, and especially William Cullen speaks.

Due to Hume's contribution, there was a similar line of development in Scottish moral philosophy to that of Scottish natural philosophy: the two discourses exhibited similar conceptual and methodological transformations while they distanced themselves from a mechanical and mathematical way of looking at phenomena, and they began to exhibit interests in qualitative differences and internal activities. This line of development suggests detachment from the ontology and methodology of Newton's *Principia* which relied on a mathematical representation of homogeneous passive matter and external forces acting on it. But it also suggests the influence of the ontology and methodology of Newton's *Opticks*, especially is more speculative Queries, that can be interpreted as allowing for comparative analysis instead of mathematical, and as admitting the potential internal activity of matter due to the concept of an aether.

The parallel development of moral and natural philosophy can be given a plausible social context with reference to the Union of 1707 and its economic consequences that also resulted in social and intellectual transformations in Scottish society. The uncertainty and hostility of the decades preceding the Union gave way to economic and social prosperity, and the trust in mathematics as a method of settling disputes that transcends factional allegiances was weakening. In this process, mathematics was increasingly represented as the possession of an intellectual sect, and Hume's view on the social construction of mathematical certainty seem to reflect traces of some such thinking.

In a similar vein, Hume's "experimental method of reasoning" is much less organically connected to the tradition inspired by the *Principia* than to that of the *Opticks*. The qualitative affinities of Hume's theory of human nature can be much more naturally interpreted on the analogy of elective affinities than on that of gravity, and this is also the context in which Hume's frequent references to the faculties of the mind are to be taken seriously. While it is a common wisdom that Hume's psychology is associationist, his theory of association is to be understood against the background of his faculty psychology. Hume's "anatomy of mind" aims to chart the faculties that can explain how ideas and impressions follow one another in the order they do. Accordingly, this anatomy is centred upon a theory that describes the active contributions various faculties make to the train of ideas.

So Hume's much quoted dictum that the mind is nothing over and above a series of consecutive perceptions is to be restricted to the contents of the mind. Hume's actual enterprise is to chart mental faculties, and the ensuing anatomy is functional anatomy: it describes faculties in terms of their effects and searching for their principles – independently of their effects faculties are not discernible. For this reason, Hume is committed to explanatory reductionism: he struggles to reduce the variety of human phenomena to a handful of principles of human nature. Hume traces this idea of explanatory reductionism back to Copernicus: due to Copernicus natural philosophy aspires to reduce the variety of natural philosophy to a limited number of laws or principles. Moral philosophy, according to Hume, shamefully lacks this aspiration that

he intends to inculcate in it, thereby initiating the Copernican turn of moral philosophy – albeit a different one than Kant's.

Explanatory reduction for Hume is to be achieved by the method of analysis-synthesis. But his method does not follow Descartes's suggestion concerning analysis into clear and distinct ideas; neither does he follow Newton's method in the *Principia* that relies on a mathematical analysis of motions in terms of forces. Instead, his method seems to be related to the method of comparative analysis suggested in Query 31 of the *Opticks*, and this method also connects Hume's enterprise to the aspirations of post-Newtonian chemistry.

Hume's study of human nature has exclusively descriptive and explanatory aspirations. This distinguishes his project from many of his contemporaries who envisaged the purpose of moral philosophy in terms of questions concerning the teleological role and duty of human beings in God's creation. As Hume showsm the common methods of moral and natural philosophy are ill suited to draw conclusions concerning transcendence – i.e. natural theology cannot be pursued with the hope of cognitive benefit. Similarly, the knowledge claims of revealed religion cannot be approved either is they are judged by the epistemic standards common to moral and natural philosophy. The chief lesson of Hume's argument in this respect is that if we accept the best epistemic standards available to us, then religion cannot have cognitive authority, so religion is not suitable to justify or support cognitive enterprises. Hume's argument is an implicit but straightforward critique of Newton's and many Newtonian's commitment that the meaning and significance of studying nature and human nature is to be located in the knowledge one thus can gain on God. Thereby Hume rejects the dominant ideology of knowledge and advocates instead a secular one that is characteristic to modern, but not early modern science.

However, Hume's cognitive ideals are not modern in every respect. While he emphasizes the role of objectivity as impartiality in the practice of making moral judgement, he also considers theoretical reasoning to be partly about a matter of taste and subjectivity. Philosophical reasoning is thus not the realm of impersonal objectivity, but of creative subjectivity. This creates and interesting tension between the practice of making moral judgement and cognition in moral philosophy in as much as moral

judgment for him belongs to the realm of objectivity much more than theoretical investigation.

To sum up, Hume occupies a post-Newtonian position with respect to methodology and the ideology of knowledge. Hume does not continue the research tradition that Newton's *Principia* initiated, rather he belongs to the camp of those Newtonians who relied and developed on the more speculative parts of the *Opticks*, and extended Newton-inspired methods and concepts to phenomena that did not, or at least not centrally, belong to Newton's fields of interests, such as chemistry, physiology and moral philosophy. Besides, Hume turned out to be an influential advocate of secular standards of knowledge by restricting the sphere of legitimate knowledge claims to the natural world around as, and placing transcendence outside the potential scope of human knowledge.

NOTES

[1] Several examples could be mentioned, two prominent ones: Porter 1995, 67ff. and Porter 2003, 33.

[2] See e.g. Stroud 1977, 8. Some more recent examples: Mounce 1999 15ff.; Pitson 2002, 6, 14 and 152; Beebee 2006, 5 and 183ff.

[3] Schofield 1969, 10.

[4] Maclaurin 1775, 21.

[5] Christie 1993, 106.

[6] Schofield 1969, 207ff and David Hume 2000 7.25n16.

[7] For the background see e.g. Schofield 1969; Donovan 1975; Reill 2005; Wilson 2009.

[8] See Yeo 2003.

[9] See Hume 2007, 1.1.2. and 3.3.6.6.

[10] For Cullen's historical introduction to his lectures on chemistry see Donovan 1975, 93ff; Hume 2007, Introduction; Hume 1932, 1:32.

[11] Hume 1932, 1:32; Hume 2000, 1.13.

[12] Hume 2007, 2.1.12.2.

[13] Hume 2007, 2.1.3.6-7.

[14] On the experimental tradition to which the *Opticks* belongs see Kuhn 1976; Hakfoort 1995. On the eighteenth-century influence of the *Opticks* see Schofield 1969; Cohen 1956.

[15] Schliesser 2010, 192f.

[16] See e.g. Golinski 1992, esp. 25-37.

[17] Snow 1959.

[18] See Garber 2000.

[19] See Boehm 2013, Hazony 2014, and Chapter VI above.

[20] Although there is a tendency to merge the canons: notable examples include Janiak 2008, Garber 2009, Janiak and Schliesser 2014, Biener and Schliesser 2014. For a recent discussion of the problem see Schmaltz 2013.

[21] Newton 2004, 140.

[22] See Cunningham 1991, Grant 2000.

[23] Harrison 2004, 43.

[24] Cited by McGuire 1995, 216.

[25] Fordyce 2003, 200.

[26] Maclaurin 1748, 3.

[27] Turnbull 2005, 1:48-50.

[28] Turnbull 2005, 1: 52-53.

[29] Turnbull 2005, 1:440.

[30] Turnbull 2005, 1:441.

[31] Hutcheson 2007, 24.

[32] Fordyce 2003, 6.

[33] Schliesser 2009.

[34] Hume 2007, 1.4.6.12.

[35] See e.g. Hume 2007, 2.1.12.2 quoted above in the Introduction.

[36] See Chapter VII for a detailed discussion.

[37] See Chapter VIII for further discussion.

[38] This is the lesson of Hume 2000, Section 8/2, and Section 11. See Chapter V.

[39] See e.g. Reill 2005, Wolfe 2008.

[40] See Wright 2002.

[41] Gregory 1998, 128.

[42] Cheyne 1787, 4.

[43] Fordyce 2003, 166.

[44] It is also in the forefront of interest in the Enlightenment in general. For a discussion of the developments on the Continent, one however that leaves out the physiological context, see Coleman 2011. However, the Scottish context deserves special attention, because as Coleman (2011, 4n7) points out "we do not find French equivalents to Hume's or Smith's reflective analysis of particular passions as part of an overall moral philosophy".

[45] See Wright 2002.

[46] Cheyne 1787, 125.

[47] Cheyne 1787, 124.

[48] Cullen 1827, 2:215.

[49] Cullen 1827, 2:366.

[50] Cullen 1827, 2:214.

[51] Cullen 1827, 1:107.

[52] Cullen 1827, 1:566-567.

[53] Albeit Mead was not Scottish, his professional socialization was certainly so. He studied medicine with Archibald Pitcairne in Leiden, and belonged to the Pitcairne Circle, which consisted mostly of Scottish medical men like George Cheyne, George Hepburn, and William Cockburn, and just like many other members of the circle he also wished to place medicine on Newtonian footing. Se he easily finds a place in the Scottish context. For further discussion see e.g. Guerrini 1986; Brown 1987. For an illustration that Scottish medicine was influential well beyond the borders of Scotland see Wild 2006.

[54] Mead 1767, 475.

[55] Mead 1767, 444.

[56] Mead 1767, 471.

[57] See Mead's "Mechanical Account of Poisons" in 1767, 3-113, 52. This essay was written in 1702 under the influence of Pitcairne without much mathematics but under the ideology of turning medicine Newtonian.

[58] See Mead's "Medical Precepts and Cautions" in 1767, 426.

[59] Turnbull 2005, 1:195.

[60] Turnbull 2005, 2: 552.

[61] Hutcheson 1993, 104.

[62] Carmichael 2002, 65.

[63] Hutcheson 2002, 58.

[64] Hutcheson 2002, 31, 95.

[65] Hutcheson 2006, 209-210.

[66] Smith 2002, 45.

[67] For a useful overview of the British aesthetic context see Stauffer 2005, 18-37.

[68] See Home Henry, Lord Kames 2005, 1:131.

[69] Hutcheson 1755, 1.4.11.

[70] Turnbull 2005, 1:195.

[71] Ibidem.

[72] Hutcheson 2002, 111.

[73] Cheyne 1787, 135.

[74] Hutcheson 2002, 76 see also 126.

[75] Hutcheson 2006, 210.

[76] Hutcheson 2002, 124.

[77] Hutcheson 1993, 104.

[78] Hutcheson 2002, 124.

[79] Mead 1767, 476-477.

[80] Coleman 2011, 29.

[81] Hume 2007, 3.3.3.7.

[82] Or at least normative moral content is at most derivative on Hume's descriptive and explanatory enterprise. See Chapter VIII.

[83] Hume 2007, 2.2.12.6.

[84] Hutcheson 2002, 119.

[85] Turnbull 2005, 2:764-765.

[86] Turnbull 2005, 2:765.

[87] Ibidem.

[88] Hutcheson 2002, 46.

[89] Dixon 2003, 5.

[90] Mead 1767, 443

[91] See Chapter V.

[92] Donovan 1975, 56-61.

[93] Cullen 1827, 2:131.

[94] Newton 2004, 139.

[95] Newton 2004, 41.

[96] Cohen 1980, 51, 151.

[97] Smith 2002, 143.

[98] Cohen 1980, 138-140.

[99] The same terminology is reflected in William Cullen's chemistry lectures notes of 1748-49. Chemistry, for Cullen, studies those properties of bodies that depend on their mixture by means of analysis of compounds into "constituent parts". This is a process of qualitative analysis that focuses on the "particular properties" of the different constituents of which a given mixture is composed, and it aims at revealing those components with respect to their "habits of mixture" and the "properties of mixts from different ingredients". See Donovan 1975, 97-99.

[100] See Shapiro 1993, 142n16.

[101] Newton 2004, 139.

[102] See Guicciardini 2009, 316-317.

[103] Hutcheson 2008, 199, in subsequent editions the subtitle has been removed.

[104] Hutcheson 2008, 128ff, 134.

[105] Four versions of the fourth edition have been identified, two of which lacks the mathematical formulation, and speak about "Rule" instead of "Canon". But the calculating spirit remains in the text. See Hutcheson 2008, 240-241.

[106] Hurcheson 2008, 120.

[107] Hutcheson 2008, 150.

[108] Hutcheson 2008, 128f.

[109] Newton 2004, 92.

[110] Hutcheson 2007, 24.

[111] Fordyce 2003, 6, Turnbull 2005, 1:10, 1:459.

[112] Turnbull 2005, 1:65.

[113] Turnbull 2003, 347, Turnbull 2005, 1:62-63.

[114] Turnbull 2003, 11.

[115] Turnbull 2005, 1:66.

[116] Turnbull 2005, 1:63-65.

[117] Hume 2007, 1.4.1.2.

[118] Hume 2007, 6.

[119] Hume 2000, 8.13.

[120] Hume 2007, 2.1.5.1.

[121] More detail in Chapter VII.

[122] See Cahpter V.

[123] Pitcairne 1727, 6-22, 9.

[124] Guerrini 1985, 250-251.

[125] Guerrini 1999, 41.

[126] Friesen 2004, 51.

[127] Pitcairne knew Newton's "De natura acidorum" since 1692, and discussed it with friends and students. See Guerrini 1987, 70-83.

[128] Guerrini 1999, 153.

[129] On Cheyne's intellectual development see Guerrini 1989.

[130] Cheyne 1733, 91.

[131] Cheyne 1733, 53

[132] See Cheyne 1733, 43 and 75.

[133] Cheyne 1733, 94f.

[134] Cheyne 1733, 76 and 99.

[135] On Friend's role in this context see Rowlinson 2007.

[136] See Hall 1980, 132-134.

[137] Cited in Schaffer 1989, 175-176.

[138] Thomson 1832, 2:677. See also Cullen 1827, 1:398. See also Schofield 1969, 191.

[139] Quoted in Thomson 1832, 1:665.

[140] See Donovan 1975, 100.

[141] Cullen 1827, 1:111 and 191-193.

[142] Cullen 1827, 1:396 and 400-402.

[143] Cullen 1827, 1:409.

[144] Cullen 1827, 1:401.

[145] Cullen 1827, 1:398.

[146] Cullen 1827, 1:398.

[147] Cullen 1827, 1:114.

[148] Cullen 1827, 1:124.

[149] Bynum 1993, 159ff.

[150] This has been a long interest of sociologically inclined historians of science. For a classic survey see Shapin 1982. See also Golinski 1990, 492-505. For a more recent retrospective reflection see Shapin–Schaffer 2011.

[151] On Pitcairne's Jacobitism as manifested in his other poems and its context see McQueen 2007, 203-206.

[152] Guerrini 1986, 303. It is an interesting question for the history of iatromechanism whether Pitcairne also taught Boerhaave. According to Guerrini and others (like e.g. Wolfe 2014) believe that Pitcairne did so, but this is challenged by others e.g. Knoeff 2002, 186.

[153] See Shapin–Schaffer 1985, 100-103.

[154] See especially Poovey 1998, 120-137.

[155] See especially Cunningham 1981.

[156] For a detailed discussion of the history of patronage in the Scottish Enlightenment see Emerson 2008.

[157] See e.g. Emerson 2004 and Dingwall 2010.

[158] See Lawrence 1979.

[159] For a useful discussion see Poovey 1998, 157-175.

[160] The crucial passage in this context is Hume 2007, 2.1.3.6–7, which I will discuss in detail bellow. Wertz argues convincingly that Hume understood the term "revolution" in its modern sense as "a radical departure or fundamental change" Wertz 1993, 416-419.

[161] See e.g. Schliesser 2010.

[162] See Hume 1932, 1:16 and 13.

[163] See Raphael 1988, 43-44.

[164] See e.g. Noxon 1973; Waxman 1994, 183-184; Capaldi 1989, 20-21; Force 1987. See also Stroud 1977, 8; Mounce 1999, 15-18; Dicker 1998, 2-4; Pitson 2002, 6, 14, 152; Beebee 2006, 5, 183-185; Hazony 2014.

[165] See Russell 1973, 231-235; Shepherd 1982; Barfoot 1990; Wilson 2009, 1–32.

[166] See Shepherd 1982, 67-71.

[167] See Wilson 2009, 34–59.

[168] See Stewart 2005, 25.

[169] See Stewart 2005, 21-22; Barfoot 1990, 152-153. See also Keill 1740; Keill 1721; Gregory 1715; Gregory 1726.

[170] Lakatos–Zahar 1978, 173.

[171] See Kuhn 1972, 172; Lakatos–Zahar 1978.

[172] Smith 1982, 76.

[173] Smith 1982, 45-46.

[174] Smith 1982, 82.

[175] Smith 1982, 48.

[176] See Schliesser 2010.

[177] Hume 2007, 2.1.3.6–7; Hume 1983, 5:153.

[178] Hume 1932, 1:24 and 26.

[179] Hume 1998, 1.10

[180] See also Chapter V.

[181] Hume concisely explains the cognitive benefits of his "science of man" in the first chapter of Hume 2000.

[182] See Serjeantson 2005.

[183] Hume 2007, 2.1.3.6–7.

[184] On Kant see Blumenberg 1985, 609; on Osiander's preface see Jardine 1984, 150.

[185] See Dear 1995, esp. 15–25.

[186] Hume 2000, 8.7.

[187] For a useful discussion of the centrality of experimental reductionism in Hume's project see Hazony, 2014.

[188] For a discussion see Leunissen 2010, 119–135, esp. 121.

[189] Hume 2007, 1.3.14.32.

[190] Hume 1932, 1:33.

[191] See Hume 2007, 3.1.2.

[192] Hume frequently expresses his aspiration to be the "anatomist of human nature". See Hume 2007, 1.4.6.23., 2.1.12.2, 3.3.6.6., Abstract 2; and Hume, 2000, 1.13–14.

[193] See Chapter VII.

[194] As Hume puts it, "we must distinguish exactly betwixt the phænomenon itself, and the causes, which I shall assign for it; and must not imagine from any uncertainty in the

latter, that the former is also uncertain. The phænomenon may be real, tho' my explication be chimerical. The falsehood of the one is no consequence of that of the other". Hume 2007, 1.2.5.19.

[195] Hume 2007, 2.1.10.4.

[196] Hume 2007a, 12.2.

[197] Hume 2000, 4.12.

[198] Hume 2000, Appendix 3.

[199] See Chapter V.

[200] Hume 2007a, 2.26.

[201] See e.g. Hume 2000, 6n10. Hume's doubts in the *Dialogues* concerning analogical arguments from design primarily do not arise from the weaknesses of analogical reasoning, but mainly from the uniqueness of the world which does not provide a sufficient pool of instances among which analogies can be found.

[202] See e.g. Hutcheson 2007, 24; Fordyce 2003, 6; and Turnbull 2005, 1:10, 1:459.

[203] Gaukroger 2006, 19.

[204] Price 1963, 9; Dauer 1975, 269ff; Beck 1978, 111-112, and more recently Mounce 1999, 4.

[205] Kant 1998, B xvi.

[206] For a suggestion to read Hume's *Treatise* as foundational in this sense see Boehm 2013.

[207] Hume 2007, Introduction 4 and 6.

[208] Blumenberg 1985, 600-601.

[209] Kant 1998, B xviii.

[210] Kant 2004, 5.

[211] Hume 2000, 8.19.

[212] Hume 2000, 8.5.

[213] See Chapter VI.

[214] Kuhn 1972, 135; Dear 1995, 118-119.

[215] See Yeo 2001.

[216] The prevalence of this orientation is clearly reflected in Scottish works of moral philosophy in Hume's day, e.g. in Hutcheson 2007, which contains his university

lectures at Glasgow that had been widely circulated even before they were published; Fordyce 2003, which is a textbook published posthumously; and Turnbull 2005.

[217] Gill 2006 traces this process and shows in detail how this was an achievement.

[218] See Wood 1990, 98f.

[219] See Barfoot 1990.

[220] See Schliesser 2010.

[221] See Noxon 1973; Waxman 1994, 183f; Capaldi 1989, 20f; Force 1987; Sapadin 1997; and Hazony 2014.

[222] Reill 2005, 37f. See also Schliesser 2012.

[223] Cohen 1980, 51, 151.

[224] Westfall 1971a, 377–380, 384; Stein 1993.

[225] See Janiak 2008, 81f. See also Hall 1963, 315. For a critique of Janiak's position see Schliesser 2011.

[226] Hume 2000, 7.3. Throughout this book I am going to suppose that Hume's main theoretical aspirations and methodological commitments remained the same throughout his entire *oeuvre*. (This is not the case with Newton, see e.g. Zemplén & Demeter 2010.) For this reason I take the liberty to support my interpretation with quotes I find the most appropriate, irrespective of when and in which work they were published. This goes without questioning that there may have been, and in fact there were, shifts of emphases in his different works. Although Daniel E. Flage (1990, 158f) suggests that Hume did not follow the experimental method in the *Treatise*; he did so only in the second *Enquiry* after "he had consciously changed his philosophical objectives". In the *Treatise*, on Flage's view, he develops his explanations from general abstract principles. I do not think, however, that this view can be sufficiently well supported.

[227] Hume 2007, 1.3.14.20.

[228] Hume 2007, 1.3.6.16 and 1.3.14.29. A similar point is argued for in Eric Schliesser 2007a. See also Rocknak 2013.

[229] Hume 2007, 2.3.3.2.

[230] Hume 2000, 12.27.

[231] Hume 2007, 2.3.3.2.

[232] See Hall 2002, 432ff. In "the course of the long dispute with Leibniz and the continental mathematicians, Newton sought to maintain that (like the ancient geometers) after having found the propositions in the *Principia* by analysis (that is, algebra) he had *demonstrated* them to the reader by means of geometry; thus at one and the same time asserting his mastery of the supreme modern analysis, calculus or fluxions, and the superiority in certainty of his work over that of others who relied entirely on discovery by analysis, without geometrical demonstration."

[233] Hume 2007, 1.3.1.4. And to this same extent geometry, just like arithmetic, can be applied in natural philosophy. Hume's position here is consistent with his evaluation of Galileo as the one who "revived" geometry "excelled in it, and was the first that applied it, together with experiment, to natural philosophy". Hume 1983, 5:110.

[234] See Gucciardini 2009, 319ff.

[235] Allison 2008, 84.

[236] For some more recent examples see Bennett 2001, 352; Pitson 2002, 14; Beebee 2006, 15; Wilson 2009, 61.

[237] Hume 2007, 1.1.4.6.

[238] Hume 2007, 2.3.8.8 and 1.1.4.1.

[239] See Newton 2004, 87. Schliesser 2010, 186ff, argues that there is no equivalent of Newton's Rule IV in Hume.

[240] Hume 2007, Abstract.1.

[241] Stein 2000, 261f, 269f, 277. For some reservations see Schliesser 2011.

[242] On Hume doing this with 'causation', i.e. starting from a metaphysical problem and turning it into a psychological one see Ott 2009, 227f.

[243] See Schliesser 2009, and also Yoram Hazony in this volume.

[244] See Cohen 1980, 135ff. On the process of changing Newton's position see Zemplén & Demeter 2010, and for a detailed discussion see Ducheyne 2012.

[245] It was first published in the Preface of the Latin edition of *Opticks* in 1706; and it first emerged in a draft version of the preface of *Opticks* in 1703-04.

[246] See Cohen 1980, 138ff, and also Zemplén & Demeter, 2010.

[247] See Gucciardini 2009, 316f.

[248] Newton 2004, 139.

[249] See Shapiro 1993, 142n16.

[250] On the critique of mathematical analysis and the rise of comparative, qualitative and functional analysis in the eighteenth century see Reill 2005, 33-55.

[251] Black, 1803, 1:547.

[252] See Guerrini 1985, 257.

[253] Hume 2007, 1.2.5.25.

[254] Hume 2007, Introduction.8.

[255] E.g. Barfoot 1990.

[256] Westfall 1971b, 77. Others have suggested that Boyle was much less committed to mechanism than it is usually thought, see e.g. Chalmers 1993; for a discussion see Anstey 2002.

[257] Maclaurin 1775, 21.

[258] Newton 2004, 140.

[259] Newton 1671/72, 3081.

[260] Newton 2004, 139.

[261] Hume 1932, 1:16, 33. This comparison is very clearly made in the following passage: "we can only expect success, by following the experimental method, and deducing general maxims from a comparison of particular instances. The other scientific method, where a general abstract principle is first established, and is afterwards branched out into a variety of inferences and conclusions, may be more perfect in itself, but suits less the imperfection of human nature, and is a common source of illusion and mistake in this as well as in other subjects." Hume 1998, 1.10.

[262] See Chapter VII.

[263] See Donovan 1975, 24f, 53.

[264] See Christie 1993, 106.

[265] See Donovan 1975, 130f. See also this very Humean passage in Cullen (1827, 2:492): If we observe that some states "regularly and constantly succeed each other" then "it is presumed that they are in the series of cause and effect with respect to one another. This we would hold as a matter of fact, even although we should not be able to explain in what manner, or by what mechanical means, these states severally produce each other."

[266] See Donovan 1975, 97ff.

[267] See Donovan 1975, 53.

[268] See Reill 2005, 79. On the various interpretations attached to the concept of aether see Schofield 1969.

[269] On the various vitalistic schools in Montpellier, Edinburgh and Halle, and their central figures are introduced in detail by Reill 2005. For more details see also Williams 2003; Wolfe 2008.

[270] Schofield 1969, 207ff; for Hume's interpretation see Hume 2000, 7.25n16.

[271] See Barfoot 1990, esp. 158 and 152. The Physiological Library, which Hume was a student member of, held a copy of the 1706 Latin edition and the third edition of 1721. For doubts about the extent of Hume's knowledge see Schliesser 2004.

[272] See Stewart 2005, 25.

[273] See Stewart 2005, 31f.

[274] Hume 1932, 1:14-18.

[275] Stewart 2005, 24n48

[276] See Wright 2003, 125-141, 129, 137n28 and 29.

[277] See Porter 1987, 80f.

[278] See Stewart 2005, 36.

[279] The second edition came with a slightly different title *A Treatise of the Hypochondriack and Hysterick Diseases*.

[280] Wright 2009, 8.

[281] Guerrini 1999, 99

[282] Mandeville 1711, 115f, 137.

[283] Cheyne 1733, 85.

[284] John P. Wright (2009, 53f) interprets Hume's "animal spirits" as a residue of Cartesian psychophysiology. However, the term was used in so many different ways, and it was also interpreted in terms of Newton's aether, that it is hardly possible to decide the question on the basis of Hume's scarce mention of it. However, other aspects of Hume's theory speak against it: if mind and body are united in a way that Hume's discussion of the organs of perception suggests, there seems to be no need for Cartesian animal spirits mediating between mind and body. Mandeville, for that matter, uses the term without any ontological commitment as to the nature of animal spirits: for him

they can be some motion of the nerves, "juice, or sipirit, or aether, or whatever it be". (See Israel 2007, 20.) Hume might have used the term in this non-committal way; that would fit his refrained attitude in questions of physiology proper.

[285] See Mandeville 1924, 1:3; on "moral anatomy" see also Turnbull 2005, 1:7.

[286] On Hume's other readings see Wright 2009; Stewart 2005; Emerson 2009a. Possibly, Cheyne's *Essay on Health and Long Life* (1724) was also on Hume's reading list, for which Cheyne was criticized because of abandoning iatromechanism (see Guerrini 1999, 153). On vitalistic ideas in the early eighteenth century in Britain see Guerrini1985; Brown 1974; Reill, 2005.

[287] See Frasca-Spada 2003.

[288] See Hume 2007, 1.2.5.20 and Hume 2000, 9.1.

[289] Hume 2007, 1.4.7.8; 1.3.10.7.

[290] Hume 2007, 2.3.9.17.

[291] Hume 1932, 1:16.

[292] Hume 2007, 1.4.6.23. See also Hume 2007, 2.1.12.2, 3.3.6.6., Abstract.2.

[293] Hume 2000, 1.13. See also Hume 2000, 1.14.

[294] Hume 2007, Abstract.2; Hume 2007a, 1.12

[295] Hume 2007b, 3.1.

[296] Hume 2007, 2.1.11.5.

[297] These rules resemble to Newton's second and third "Rules for the Study of Natural Philosophy" in Newton 2004, 87ff.

[298] Dixon 2003, 107.

[299] As Jerry Fodor (2003, 29n3) rightly points out, Hume's explanation of cognition presupposes "a certain amount of faculty psychology": "Empiricists have often claimed that their theory of the mind requires no faculty except association. It's clear, however, that Hume can't endorse any such exiguous thesis."

[300] See Hume 2007, 1.4.6.4.

[301] There are "permanent, irresistible, and universal" (structurally fundamental) principles and "changeable, weak, and irregular" (socially, individually or historically contingent) principles of human nature. The first group is the proper study of a science of man. Hume 2007, 1.4.4.1

[302] See Hume 2000, 1.13; Hume 2007, Introduction.10.

[303] Hume 2007, 1.4.3.10.

[304] See John Locke, *An Essay concerning Human Understanding*, Oxford: Clarendon, 1975, 2.21.17.

[305] See Barfoot 1990, 171f.

[306] Keill 1745, 2, 4.

[307] See French 2003, 214f.

[308] As Hume puts it, "we must distinguish exactly betwixt the phænomenon itself, and the causes, which I shall assign for it; and must not imagine from any uncertainty in the latter, that the former is also uncertain. The phænomenon may be real, tho' my explication be chimerical. The falsehood of the one is no consequence of that of the other". Hume 2007, 1.2.5.19.

[309] Hume 2007, 1.3.14.34.

[310] See e.g. Cohon 2008, 66f.

[311] Hume 2007, 2.1.10.4.

[312] Wilson 2009, 38.

[313] For a similar view see Schliesser 2010.

[314] See Hume 2007, 1.1.2. and 2.1.1.2.

[315] See Hume 2007, 1.3.5.2.

[316] See Hume 2007, 1.4.2.45, 2.1.5.6.

[317] This is obvious from Hume's letter to Hutcheson, Hume 1932, 1:33.

[318] See Hume 2000, 8.36.

[319] Hume 2007b, 3.1ff.

[320] See e.g. Cunningham 1988, 1991.

[321] See Hume 2007, Abstract.1, Hume 2000, 1.9.

[322] Hume 2000, 7.29 and 1.9.

[323] See Emerson 2009b, see also Golinski 1992, 11-50; Donovan 1975, 49-76.

[324] See Shapin 1996, 78.

[325] Gaukroger 2010, 30.

[326] Cunningham 1991, 388. For a discussion see Grant 2000.

[327] Henry 2009, 110n65.

[328] This is aptly illustrated in the Leibniz-Clark correspondence. See Shapin 1981.

[329] Gucciardini 2009, 15; Snobelen 2007.

[330] See e.g. Wilson 2008, 98-100.

[331] Newton's "De Gravitatione" in Newton, 2004.

[332] See Guerrini 1999, 85-87.

[333] Maclaurin 1775, 3f.

[334] See e.g. Buckle 2001, 238ff.

[335] Hume 2007, 1.4.7.13.

[336] Letter to George Campbell, 7 June, 1762, in Hume 1932, 1:361.

[337] Letter to Henry Home, 2 December, 1737, in Hume 1932, 1:24.

[338] Wright 2003, 129, 137n28 and 29.

[339] Hume 2000, 10.1.

[340] On the general epistemological relevance of Hume's section see Gelfert 2010.

[341] Hume 2000, 10.38.

[342] Hume 2000, 10.17.

[343] Hume 2000, 10.35, 36, 38.

[344] Hume 2000, 6.n10.

[345] Hume 2000, 6.4.

[346] Hume 2000, 10.12. The definition in the main text, which can be taken as Hume's official definition, treats 'miracle' as an epistemic category. There is, however, a more restricted definition given in a footnote (Hume 2000, 10.12n23) which requires that the violation of a law of nature be the consequence of divine intervention: "A miracle may be accurately defined, *a transgression of a law of nature by a particular volition of the Deity, or by the interposition of some invisible agent*. A miracle may either be discoverable by men or not. This alters not its nature and essence." The definition sounds more ontological than epistemic one, as it does not involve reference to our epistemic condition. In the present context I am focusing exclusively on the official definition.

[347] Hume 1983, 2:398–404.

[348] Hume 2000, 10.10. For a discussion of related problems see Earman 2000, 34ff. As he puts it, Hume "was able to create the illusion of a powerful argument by maintaining

ambiguities in his claims against miracles" (Ibid. 70). It seems to me that the ambiguity of 'miracle' and 'marvel' is the most important one among them.

[349] Hume 2000, 10.16.

[350] Hume 2000, 10.5.

[351] Hume 2000, 10.7.

[352] Hume 2000, 10.13.

[353] Hume 2000, 10.4.

[354] Hume 2000, 10.9.

[355] Hume 2000, 10.13.

[356] Hume 2000, 10.36.

[357] Shapin 1994, 410ff.

[358] Hume 2000, 10.15.

[359] Professional knowledge emerged as a requirement in the Royal Society's practice toward the end of the seventeenth century. See Daston–Park 1998, 249.

[360] See Schliesser 2010, 213-248.

[361] Hume 2000, 10.16.

[362] Hume 2000, 10.20.

[363] It is a cardinal methodological norm for Hume. See Hume, *Treatise* 2.1.3.6-7. For a discussion see Chapter III above. On the central role of explanatory reduction and its Newtonian origins see Hazony 2014.

[364] Hume 2000, 10.24.

[365] See Hume's letter to Hugh Blair, 1761, in Hume 1932, 1:350.

[366] On Hume's methodological preferences see Chapter VI.

[367] Sprat 1734, 352. See also Dear 1990.

[368] See Daston–Park 1998, 215.

[369] Daston–Park 1998, 239

[370] See for example Boyle's comment on Cellini's report on having seen a carbuncle (i.e. a gem blazing in the dark) that seems to be equivalent to the Indian prince's case, so it is at least marvellous, but if as I have indicated above, the distinction between miracle and marvel is all too blurry to maintain, then it counts as miraculous. Yet, Boyle is willing to accept Cellini's testimony. See Boyle's "Natural Phosphory" in Boyle 1725, 149.

[371] Hume 2000, 10.36.

[372] Hume 2000, 10.37.

[373] Hume 2000, 10.38.

[374] Sprat 1734, 214.

[375] See Boyle's "Experiments and Observations upon Colours" in Boyle 1725, 44.

[376] Henry 1990.

[377] Hume 2000, 10.38.

[378] See Boyle's "Experiments and Observations upon Colours" in Boyle 1725, 44.

[379] See Boyle's "The Christian Virtuoso" in Boyle 1725, 259.

[380] Henry 1990, 91f.

[381] On the appetite for strange facts in the context of the Baconian program of natural philosophy see Daston–Park 1998, 250. They argue that the project of enlarging natural history, collecting counterexamples to received natural philosophical axioms, motivating inventions of art, etc. was the main drive behind lowering the threshold of admitting miraculous phenomena. This situation was to change in the 1730s and 1740s – which is, one could add, reflected in Hume's discussion of miracles.

[382] Hume 2000, 8.30.

[383] Hume 2000, 8.32.

[384] Hume 2000, 8.35.

[385] Hume 2000, 8.36.

[386] Hume 2000, 8.36.

[387] Holden 2010, 28.

[388] Holden 2010, 46

[389] Hume 2000, 11.10.

[390] Hume 2000, 4.1-13, 12.28-29.

[391] Hume 2000, 11.11.

[392] For a detailed discussion see Chapter VI.

[393] See Serjeantson 2005.

[394] Hume 2000, 11.12.

[395] Hume 2000, 11.13.

[396] See Hume 2000, 8.7-9.

[397] Hume 2000, 11.14.

[398] See Jardine 1974, 249. For a detailed discussion see Chapter VI.

[399] Hume 2000, 11.25.

[400] Hume 2000, 11.26.

[401] Hume 2000, 11.20. See also 11.26n31: "Let the inferred cause be exactly proportioned (as it should be) to the known effect; and it is impossible that it can possess any qualities, from which new or different effects can be inferred."

[402] Hume 2000, 11.16, 18.

[403] One should note that this is quite contrary to what Philo deems plausible in Hume 2007a, 12.7, 33.

[404] Hume 2000, 11.27.

[405] Hume 2000, 11.15.

[406] Hume 2000, 11.17.

[407] Hume 2000, 11.26.

[408] On the various uses of 'hypothesis' and related terms like 'query' and 'conjecture' see Anstey 2004.

[409] Hume 2000, 11.3.

[410] See Buckle 2002, 284ff.

[411] Hume 2000, 11.30.

[412] Hume 2000, 10.40 see also 11.10.

[413] Hume 2000, 10.41.

[414] Hume gives a quasi-psychological and quasi-sociological account of the origins of religion in Hume 2007b.

[415] Hume 2000, 11.9.

[416] Hume 2000, 11.4.

[417] Hume 2000, 11.20.

[418] Hume 2000, 11.28.

[419] Hume 2000, 10.40.

[420] On fictionalism in general Rosen 2005.

[421] Hume 1983, 3:134-135. See also the role Hume ascribes to religion in his essay on the "Idea of a Perfect Government" in Hume 1987, 512-529.

[422] Hume's *Dialogues concerning Natural Religion* offers a more radical and more general critique of religion.

[423] See the Appendix attached to Baumstark 2012, 256-257.

[424] See Hume 2000, 10.17, 11.29.

[425] See e.g. Schabas 2005, 80.

[426] See e.g. Hatfield 1995, 208.

[427] See e.g. Brandt 2006, 143.

[428] See Allan 1993, 154.

[429] See e.g. Stroud 1977, 3ff.

[430] See Barfoot 1990, Sapadin 1997.

[431] Wood 1990.

[432] Reill 2005, 37f.

[433] See Gascoigne 1994, Reill 2005.

[434] See Dear 1995, 21.

[435] See Dear 2006, 26f.

[436] See Schofield 1969, 91ff.

[437] See Shapin and Schaffer 1985, 110ff.

[438] See Skinner 2002; Bird 1996.

[439] Locke 1975, 44.

[440] See Irwin 2008, §679f.

[441] For a diagrammatic overview see Kusukawa 1996, 69.

[442] See Gascoigne 2006, 863f.

[443] Hume 2007, Introduction.10.

[444] See Hume 2007, 2.3.1.15, Hume 2000, 8.18.

[445] Hume 2007, 3.2.9.4.

[446] Hume 2000, 1.13.

[447] Hume 2007, Introduction.10.

[448] Hume 2007, 2.3.2.2, Hume 2000, 8.21-22.

[449] Hume 2000, 1.13.

[450] See e.g. Hume 2007, 3.1.2.1.

[451] See e.g. Hume 2007, 2.3.4.8.

[452] Hume 2007, 1.4.6.

[453] Hume 2000, 7.5ff.

[454] Hume 2000, 8.7.

[455] Kuhn 1976, 50.

[456] Whereas I have not the space to discuss this problem here, Hume certainly does it in the chapter "Of Miracles" (Hume 2000, 10).

[457] Hume 1882c, 390.

[458] Hume 1882a, 175ff.

[459] Hume 2007, Introduction.10.

[460] Kuhn 1976, 44.

[461] Hatfield 1995, 208.

[462] Wood 1990, 98f.

[463] See Emerson 2009.

[464] Hume 2007, 2.2.6.3f.

[465] Locke 1975, 1.2.9.

[466] Marshall and Williams 1982, 93.

[467] Hume 1882b, 246ff.

[468] Hume 2007, 1.1.1.10. For a discussion see Chapter VII.

[469] Hume 2007, 1.2.1.4.

[470] Hobbes 1845, 184.

[471] See Garber 2000, 37.

[472] Hume 1998, 1.10.

[473] See e.g. Hume 2000, 4.10ff.

[474] Sprat 1734, 341.

[475] Hume 1932, 16.

[476] Hume 2007, Abstract.1.

[477] Hume 2000, 7.29.

[478] See Hume 2000, 1.9.

[479] Hume 2007, 1.3.15.11.

[480] Hume 2007, Appendix.3.

[481] Hume 2000, 8.9.

[482] Hume 2000, 1.12.

[483] Hume 2007, 3.3.1.7.

[484] See Pompa 1990, 21, 36f.

[485] Hume 2007, 1.2.5.19.

[486] See Hume 2000, 8.7.

[487] Smith 1995, 89.

[488] Hume 2000, 1.13.

[489] Hume 2007, 1.4.4.1.

[490] Hume 1998, 7.11ff.

[491] Hume 1998, 6.1f.

[492] Hume 2007, 1.4.7.23.

[493] See also Hume 1932, 32f; Hume 2007, 3.3.6.6.

[494] Hume 2007, 2.3.10.9.

[495] Schofield 1969, 91ff.

[496] Schofield 1969, 95.

[497] Schofield 1969, 10f, 93f.

[498] Reill 2005.

[499] See Wood 1990.

[500] Reill 2005, 69.

[501] Gascoigne 2006, 863f.

[502] Cunningham 2007.

[503] Hume 2007, 2.1.11.3.

[504] Hume 2007, 1.3.14.16ff.

[505] Reill 2005.

[506] Reill 2003, 38.

[507] See Wright 1990 and 2000.

[508] Packham 2002, 468.

[509] See Reill 2005 69f.

[510] See Wright 2009, 8f, 16f.

[511] See Barfoot 1990 and Schabas 2005, 65ff.

[512] See Hume 2007, 1.1.2 and 3.3.6.6.

[513] McIntyre 2006, 211.

[514] Hume 2007, 1.1.5.3.

[515] Hume 2007, 1.4.6.18.

[516] Hume 1932, 1: 32f.

[517] Hume 2007, Introduction.4.

[518] Hume 2007, 1.1.2.

[519] Hume 2007, 2.2.6.1.

[520] Hume 2007, 1.1.1.10.

[521] Hume 2007, 1.4.6.4.

[522] Hume 2007, 1.2.5.19.

[523] Hume 2000, 1.9 and 7.29.

[524] Hume 2007, 2.1.11.5.

[525] Hume 2007, 1.1.4.1 and 2.2.5.14.

[526] Hume 2007, 2.1.5.6.

[527] On Hume's method see Chapter VI.

[528] Locke 1975, 2.21.17.

[529] Hume 2007, 2.3.1.2.

[530] Hume 2007, 2.3.2.2.

[531] See e.g. McIntyre 2006.

[532] Hume 2007, 2.3.3.4.

[533] Hume 2007, 2.3.5.1.

[534] Hume 2007, 1.3.2.2.

[535] Hume 2007, 2.2.8.6.

[536] See Editors' annotations Hume 2007, vol. 2, 747, 853.

[537] Porterfield 1735, 1737.

[538] See Hume 2007, 1.3.9.11. and also Wright 1990, 265ff.

[539] See e.g. Wright 1990, 267.

[540] Hume 2007, 2.1.4.3., 2.3.6.1.

[541] Hatfield 1995, 188.

[542] Hume 2007, *Treatise* 2.1.10.4., and see also 1.3.14.34.

[543] Cohon 2008, 67ff.

[544] Cunningham 2007.

[545] See Hume 2007, 2.1.11.3., 3.3.1.7.

[546] Hume 2007, 1.3.14.15-20.

[547] Hume 2000, 1.13 and 2007, Introduction.10 [p. 9-10].

[548] Cullen 1827, 1:440.

[549] Wright 2002, 251 and Reill 2005, 122ff.

[550] Hume 2007, 1.2.5.20 and 2000, 9.1.

[551] See Schaffer 1999, 126-165.

[552] Reill 2005, 78.

[553] See e.g. Broughton 2006, 51.

[554] Arguably, it was Cheyne to whom Hume intended his famous "Letter to a physician". See Burton 1846, 1:42f, and more recently Wright 2003.

[555] Cheyne 1733, 4f.

[556] Hume 2007, 2.3.9.

[557] Hume 2007, 2.2.9.

[558] Hume 2007, 2.1.4.

[559] Hume 2007, 2.3.9.17.

[560] Reill 2005, 69.

[561] Hume 2007, 2.3.6.8.

[562] Hume 2007, 2.1.11.3.

[563] Hume 2007, 1.4.6.12.

[564] Hume 2007, 2.2.5.21.

[565] See Reill 2005, 135-142.

[566] Daston–Galison, 2007.

[567] Daston 1992.

[568] Hume 2007, Introduction.4.

[569] Daston 1992, 600, 597.

[570] See e.g. Hume 2007, 2.2.8.6, and Hume 1998, 5.41.

[571] Nagel 1986, 7.

[572] Nagel 1986, 3–4.

[573] Daston – Galison 2007, 58.

[574] Daston – Galison 2007, 60, 66.

[575] Daston – Galison 2007, 60.

[576] See Chapter VI above.

[577] Daston–Galison 2007, 59. For a detailed discussion of the epistemic and methodological commitments of Enlightenment naturalists see Reill 2005.

[578] Here I diverge from e.g. Stephen Darwall's reading who argues that moral sentiment for Hume, and for Hutcheson too, is an "observer phenomenon". If Hume is interpreted this way then moral cognition and moral philosophy are prone to be conflated, and cannot be represented as distinct practices. See Darwall 1995, 285–286. More recently, Darwall lists Hume among those philosophers "for whom evaluation of conduct and character does not take a fundamentally second-personal form". See Darwall 2006, 77.

[579] Hume 2007, 1.4.3.11.

[580] Hume 2007, 3.1.1.26.

[581] Hume 2000, 1.4.

[582] Hume 2007, 2.3.4.8, see also 3.1.2.1.

[583] For an excellent discussion of the "moral sensing" interpretation of Hume's position see Cohon 2008.

[584] Hume 1998, 8.40. For a discussion of the distinctive features of human beings in Hume see Beauchamp 1999.

[585] Hume 1998, 7.13.

[586] See Cohon 2008, 163.

[587] See Hume 2007, 1.4.4.1.

[588] Hume 2007, 3.3.1.7.

[589] Hume 2007, 3.3.1.14.

[590] Hume 2007, 3.3.1.20.

[591] Hume 2007, 3.3.1.15.

[592] This perspective on understanding others has proven to be an important inspiration for a position in contemporary research in philosophy and psychology. On Hume's significance for this position see e.g. Goldman 2006, 17. See also Steuber 2006, 29–31.

[593] See e.g. Hume 2007, 2.2.8.6, and Hume 1998, 5.41.

[594] Although this process corrects our naturally biased sentiments, it cannot turn us into an ideal observer. See e.g. Bricke 1996, 157.

[595] Hume 2007, 3.3.1.30.

[596] Hume 2007, 3.3.3.2.

[597] Hume 2007, 2.3.1.15-16.

[598] Hume 1998, 9.6.

[599] Hume 1998, 5.41–42.

[600] Rachel Cohon characterizes this aspect of the common point of view very aptly: "The common point of view is not a detached perspective, but the vantage point of the person being evaluated and the particular individuals with whom he has direct dealings. It gives us not a wide panorama, but an intimate glimpse. The common point of view is distant from us only in the sense that our presence there is imaginary rather than actual. It is general or common not in the sense of being a broad view, but rather in the sense that it is a view available to every reflective person and the same for all who adopt it." Cohon 2008, 144.

[601] Hume 2007, 1.3.8.12.

[602] Daston–Galison 2007, 59.

[603] See e.g. Hume 1932, 1:16 and 13.

[604] See e.g. Hume 2000, 10.38.

[605] See e.g. Hume 2007, Introduction. See also Daston–Galison 2007, 59–60.

[606] Hume 2007, 1.1.7.11.

[607] Hume 2007, Appendix.3.

[608] Hume 2007, 1.3.13.25.

[609] Hume 2007, 1.1.5.3.

[610] Hume 2007, 1.4.6.18.

[611] Hume 2007, 3.2.3.4, n. 71.

[612] Hume 2007, Abstract. 1.

[613] Hume 2007, 3.3.6.6.

[614] Compare Irwin 2008, 2:564–565. Irwin has doubts about the tenability of Hume's separation of moral cognition and moral philosophy on the grounds that second-order talk about e.g. moral properties has inevitable influence on first-order moral practice. So

moral philosophy must be directly relevant to moral cognition. Given Hume's naturalistic commitments to the description and explanation of moral phenomena I am more inclined to think that Hume offers what he thinks to be the best account of our actual moral practice. We may be mistaken about it, and can see ourselves as moral realists, but that is just a false account of what we actually do. And *vice versa*: Hume allows that his account, in this and other respects, turns out to be true, yet the phenomena themselves are untouched by false conclusions (see Hume 2007, 1.2.5.19). Either way, moral practice is not directly influenced by second-order conclusions about moral phenomena.

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